THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

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BY
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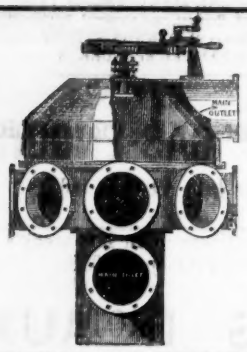
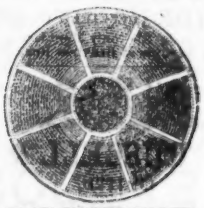
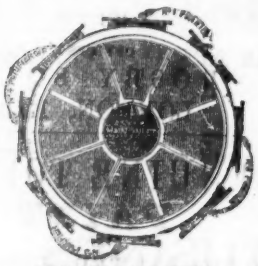


ELEVATION OF THE CENTRE-VALVE.



PLAN OF THE VALVE.



PLAN OF THE BODY.

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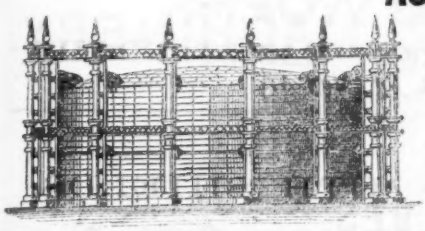

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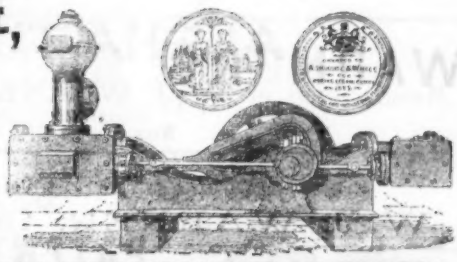

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Most Effectively and Economically restores this waste *ad infinitum*.

The Patentee having devoted more time and attention to this subject than perhaps any other person living, is now in a position to recommend the adoption of this process to Gas Companies and Corporations with the utmost confidence in its practical utility, convenience, and economy. 1st. It restores the spent Lime at from one-third to one-half its original cost, apart from its undoubted convenience and the economy of space. 2nd. There is practically no limit to the duration of the Lime. 3rd. The cost of apparatus for the introduction of the process is very moderate and exceedingly durable. 4. The Patentee supplies special bricks and castings, erects and proves the process on the most favourable terms.

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The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

The advantages attending its use are—

INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

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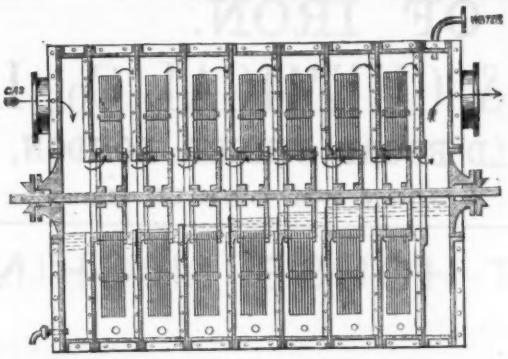
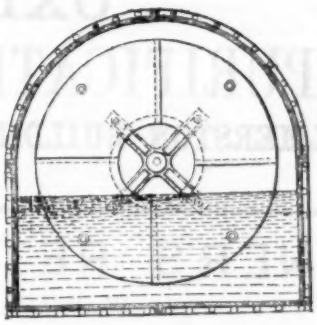
PATENT "STANDARD" WASHER-SCRUBBER COMPANY.





These Machines contain from 3200 feet to 65,000 feet of Wetted Surface.

The Special Merits of this Washer are as follows:—That it is not necessary to reduce the temperature of the gas to 60°, or thereabouts, to make it effective; **and that as no tar is retained in it, the illuminating power is not reduced as in Tower Scrubbers.** That the distribution of the liquor is made with unerring regularity. That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather. That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided. That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas as it ascends. That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured. That it is much cheaper than any other Scrubber that will do the same amount of work effectually. That it is the only Washer suitable for purifying Gas from all its impurities by solution. That it works with a minimum of pressure. That it takes out every trace of Ammonia from the Gas in once traversing the machine, as well as a very large quantity of carbonic acid and sulphuretted hydrogen. That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

Messrs. Kirkham and Hersey. *The Gaslight and Coke Company, Beckton, North Woolwich, June* 8, 1880.

Gentlemen,—I enclose you some particulars of the working of your Washers here, and I intend having some more experiments made, as just now we are working the first Washer with liquor and the second with water. Of course the fact of our having ordered two more, in addition to the four which we have in use, is a sufficient indication of my opinion of the value of the Washer. (Signed) G. C. TREWBY.

Messrs. Kirkham and Hersey. 25, *Palace Chambers, Bridge Street, Westminster, S.W., July* 19, 1880.

Dear Sirs,—The "Standard" Washer which you supplied for use at the Vauxhall station of the Phœnix Gaslight Company afforded me entire satisfaction. It was designed to remove the Ammonia from 3 million cubic feet of gas per day, and during the past winter it did so with a good working margin to spare. It is as excellent now in workmanship as in design, and is well worthy the general acceptance with which it appears to be meeting. I am, faithfully yours, (Signed) CORBET WOODALL.

Messrs. Kirkham, Hulett, and Chandler. *The Gaslight and Coke Company, York Road, King's Cross, Jan.* 14, 1879.

Gentlemen,—In reply to your inquiry, I am pleased to say the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, **it takes out every particle of Ammonia,** while purifying more Gas than it was intended to do. I enclose particulars of a week's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.—I remain, &c., (Signed) JOHN CLARK, Engineer.

Messrs. Kirkham and Hersey. *Phœnix Gaslight and Coke Company, Office, Greenwich, S.E., Dec.* 19, 1879.

Gentlemen,—In accordance with my promise that I would inform you as to the working of the "Standard" Washer erected by you here in June last, I now write to say that we are passing through it 100,000 cubic feet per hour (the quantity for which it is made) direct from the Condensers, "bye-passing" the whole of our Scrubbers, which, not being needed, have been standing still since the "Standard" Washer was put in use. It seems as though the Washer more effectually removed the Ammonia when taking the full quantity of gas than less; as, at the present time, at the sixth chamber (there being eleven in all) not a trace can be discovered either by turmeric or acid litmus paper. The difference in pressure between inlet and outlet is only ten-tenths of an inch. I need scarcely say, after the above, how perfectly satisfied I am. (Signed) P. J. WATES, Engineer.

Messrs. Kirkham, Hulett, and Chandler. *Corporation of Birmingham, Gas Department, Saltley Works, May* 23, 1879.

Gentlemen,—I beg to enclose you a copy of the results of the tests which, by the kind permission of the Engineer, Mr. Clark, I made on the 6th of March last, of the working of one of your "Standard" Washers and Scrubbers at the St. Pancras Station of The Gaslight and Coke Company, and I am of opinion that, for an apparatus occupying so small a space, they are exceedingly satisfactory.—Yours truly, HENRY HACK, Engineer.

Messrs. Kirkham and Hersey. *The Leeds Corporation Gas-Works, Meadow Lane, Aug.* 14, 1879.

Gentlemen,—In reply to your inquiry of yesterday's date, I have pleasure in stating that the item appearing as income derivable from Ammonia in my estimate of revenue for current year is not an exaggeration. Our average income from Ammonia is 2s. 8d. per ton of coals carbonized, but at the works where your invention is in use we derive not less than 3s. per ton. Since the introduction of efficient Scrubbers at our works the greater yield of this product (now twice as valuable as coke to us) is such that the cost of Apparatus for its extraction can be wholly paid for out of from nine to twelve months gains. I am, Gentlemen, yours faithfully, (Signed) H. WOODALL, Engineer.

Dukinfield, Denton, and Haughton Gas-Works, Dukinfield, July 31, 1880.

Messrs. Kirkham, Hulett, and Chandler, Limited, 59, Palace Chambers, Westminster.

Gentlemen,—We commenced the use of your "Standard" Scrubber on the 1st of February last, and from that date to the end of June we had passed 168¼ tons of Ammoniacal Liquor of 6° strength into the tar well, as indicated by a liquid-meter. This liquor being sold at 19s. per ton realized £160, which was a clear gain to us of 1s. 0½d. per ton of Coal carbonized, due to the use of your Washer, in addition to which there was a saving in the cost of purification.

During the above period we had removed the Ammonia from 28½ million feet of gas, and as we make 81 millions yearly, the saving, at the same rate, would be £460 per annum. The Apparatus (without foundations and connections) cost £420, so that it will pay for itself within twelve months of its erection. I am, yours truly, (Signed) HARRISON VEEVERS, Engineer and Manager.

Messrs. Kirkham, Hulett, and Chandler, Limited. *Leominster Gas and Coke Company, Limited, March* 20, 1880.

Gentlemen,—In reply to yours of the 18th inst., we have a 3½-horse power "Otto" Silent Gas Engine; this drives by belt a 5000 feet per hour Beale's Exhauster, Tar, Liquor, and Water Pumps, and your "Standard" Washer-Scrubber. The engine is easily managed, and is sufficient for nearly double the work it has yet had to do. I think a 1 to 1½-horse power engine amply sufficient for a Washer for 7000 to 10,000 feet per hour.

With regard to your Washer-Scrubber, it causes a very decided improvement in the illuminating power of the gas—say 1¼ candle; it is now 17 candles by No. 1 Sugg's Argand burner. Clear water supplied at the rate of 10 gallons per ton of coal comes out 5° to 6° Twaddel, and we find the purifiers much freer from tar, and requiring less lime. Our Working Manager says your Washer is the best machine that ever came into the works.

Yours truly, (Signed) JOHN F. SOUTHALL.

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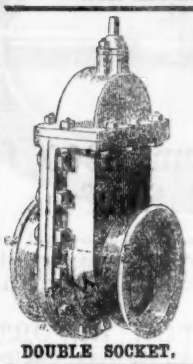
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IMPROVED SCREW-VALVES,
For Water, Tar, Ammoniacal Liquor, &c.

MADE EITHER WITH FLANGED OR SOCKET ENDS.

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MANUFACTURERS OF
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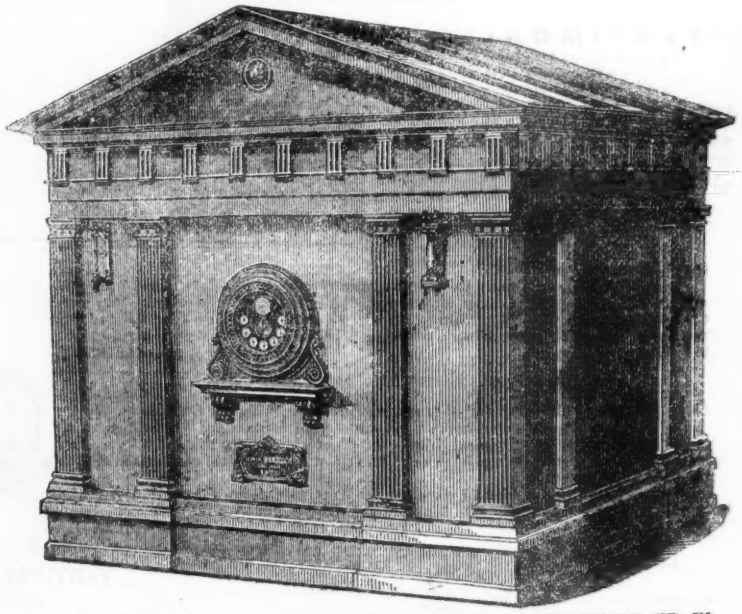
BRADDOCK'S PATENT COMPENSATING GAS-GOVERNORS;
ALSO LICENSEES AND MANUFACTURERS OF
WARNER & COWAN'S PATENT SELF-REGULATING GAS-METERS;
ROUND STATION-METERS,
ON CAST-IRON STANDS.



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SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

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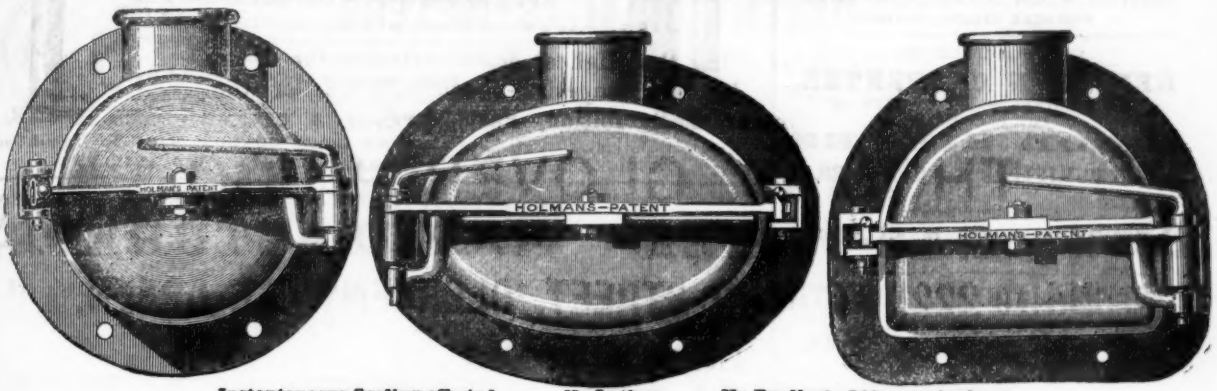
Anti-Friction Catches, and Self-Sustaining Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.
Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Morton's Patent Retort-Lids are in use in nearly all the Principal Gas-Works in the United Kingdom and the Colonies; also on the Continent and in the United States of America. They are now made of the

SAME FORM OR SECTION AS THE RETORT. (See Illustrations above.)

Engineers preparing Specifications of New Works will be furnished with Dimensions of Stock Patterns, together with Approximate Weight and other data on application.

HUNT'S

EQUILIBRIUM DIRECT-MAIN GAS GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight & Coke Co. (19), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Hales-owen, Leicester, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

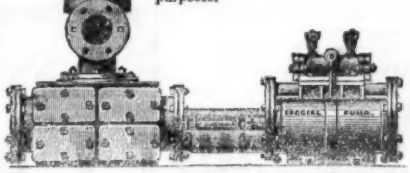
Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

THE

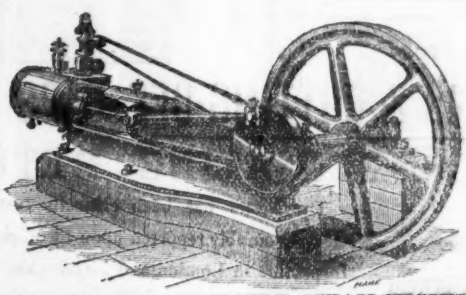
"SPECIAL" DIRECT-ACTING STEAM-PUMP.

These Pumps are in use in upwards of one hundred Gas-Works in the United Kingdom, &c., pumping Water, Tar, Ammoniacal Liquor, &c. For Tar, &c., they are provided with extra long distance pieces, and Pumps are entirely of iron, with faced valves to withstand the action of the liquid. The sizes below marked thus * are usually kept in stock for these purposes.



The quantities delivered of Tar should be taken about two-thirds that of water.

Diameter of Steam Cylndr.	Diameter of Water Cylndr.	Length of Stroke.	Gals. of Water per Hour, Approx.	Prices for Water.	Prices for Tar and Ammoniacal Liqr.
*3 in.	1¼ in.	9 in.	450	£16 0 0	£17 0 0
*4 ,,	2 ,,	9 ,,	815	18 0 0	19 0 0
*5 ,,	2¼ ,,	12 ,,	1,250	21 0 0	22 10 0
*5 ,,	3 ,,	12 ,,	1,830	22 10 0	24 0 0
*6 ,,	3 ,,	12 ,,	1,830	25 0 0	26 10 0
*6 ,,	4 ,,	12 ,,	3,250	30 0 0	31 10 0
6 ,,	5 ,,	12 ,,	5,070	35 0 0	36 10 0
*7 ,,	5 ,,	12 ,,	5,070	40 0 0	41 10 0
7 ,,	6 ,,	12 ,,	7,330	45 0 0	46 10 0
*8 ,,	6 ,,	12 ,,	7,330	50 0 0	52 0 0
10 ,,	6 ,,	12 ,,	7,330	60 0 0	62 10 0
10 ,,	8 ,,	12 ,,	13,000	75 0 0	77 10 0



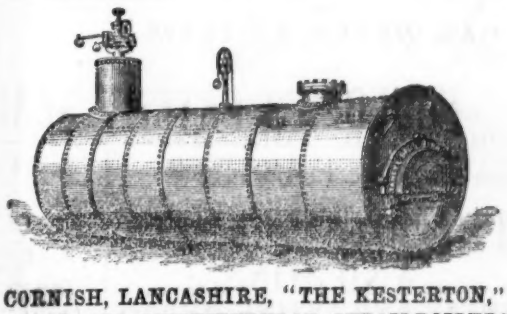
TANGYE'S HIGH-PRESSURE STEAM-ENGINE,

NEARLY 4000 IN USE.

The Design, Workmanship, and low prices of these Engines have called forth universal approval.

Nom. H.P.	2	3	4	6	8	10	12	14	20	25
	£28	£37	£44	£68	£86	£111	£122	£133	£185	£215

Including Governor and Feed Pump. Variable Expansion extra.



CORNISH, LANCASHIRE, "THE KESTERTON," VERTICAL, AND MULTITUBULAR STEAM-BOILERS OF SUPERIOR QUALITY ALWAYS IN STOCK.

This Department having been greatly extended and furnished with the most approved Boiler-making Machinery and Tools, T. B. & H. are prepared to supply all kinds of Steam-Boilers with great facility at lowest current prices.

Also Makers of IMPROVED HYDRAULIC HOISTS, TRAVELLERS, CRABS, CRANES, PULLEY BLOCKS, HYDRAULIC AND SCREW LIFTING JACKS, LATHES, PUNCHING AND SHEARING MACHINES, And all other Descriptions of Tools, &c.

FULL PARTICULARS, ESTIMATES, CATALOGUES, &c., ON APPLICATION.

London, 1862. New York, 1863. Paris, 1855. London, 1862.

Dublin, 1865 **The SIX MEDALS AWARDED to THOMAS GLOVER for** Paris 1867.

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

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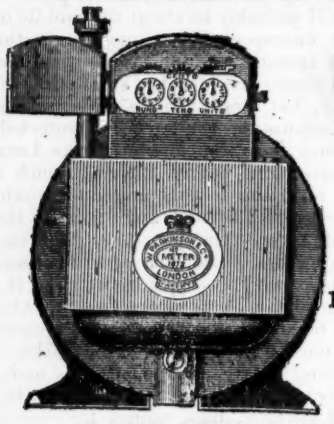
THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.

(ESTABLISHED 1816)



WET & DRY METERS,

STATION-METERS & GOVERNORS,

EXHAUSTER REGULATORS,

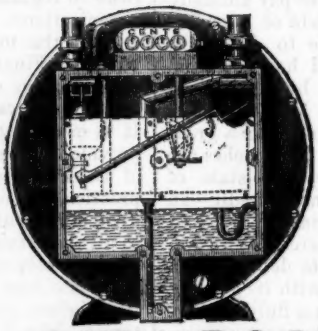
PRESSURE REGISTERS, EXPERIMENTAL APPARATUS, GAUGES, WATER-METERS, &c.

SOLE AGENTS FOR

FOULGER'S PATENT SEAL UNIONS & CUTTING-OFF CAPS.

HUNT'S PATENT IMPROVED COMPENSATING METER.

In this Meter, the action of the measuring-drum is reversed. By this arrangement an improvement is effected in the registration at high speeds, which, in many tests, has not varied from the smallest light to three times the capacity of the meter. It works equally well under all pressures. The range of error between the high and low line is much smaller than that allowed by the "Sale of Gas Act."



The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

G. B. I.—*Directly we obtain the necessary particulars, an account of the two gas-engines you mention shall be published.*

W. W.—*As your letter may lead to some correspondence, we have held it over till next week; so that the whole of the references to the matter may appear in one volume of the* Journal *and not be divided, as they would be if the subject were referred to this week.*

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, DECEMBER 28, 1880.

Circular to Gas Companies.

Nothing illustrates more clearly the difference between ancient or mediæval and modern political economy, than the alteration in the standards by which corporate wealth is estimated. In former times a town or country was considered to be rich in proportion to the amount of positive wealth in gold, or other realizable effects, actually in its treasury, and awaiting a possible conqueror. In modern days, so far from a rich community having any disposable cash in its public coffers, it is generally remarkable for being positively in debt to an amount quite beyond its power to repay at short notice. In fact, a common measure of the wealth of a modern community, national or municipal, is its power to borrow money at low rates of interest. Yet it is beyond dispute that the Government of this country, with its liability to pay annually nearly 29 millions sterling as the cost of a debt of over 782 millions, which it is otherwise quite unable to discharge, represents a nation richer than any the world has yet seen. The fashion of chronic indebtedness thus set by the general Government is faithfully followed by our Municipalities, who, even if they possess much property, always owe a great deal more than they can pay; in other words, their riches are represented by their liabilities. Of course, this state of things is due to the modern growth known as credit—an influence that has revolutionized the social state of civilized man only within the past 300 years. Public credit is a wonderful thing, only surpassed in its power by its delicacy, and this extreme sensitiveness appears to increase with its growth. We are all interested in its maintenance in a duly healthy condition, yet not even those who claim to be most conversant with its moods can foresee its state from one week to another. Consequently, those who are about to test its condition in a practically crucial manner, may be excused for manifesting much anxiety, and even trepidation, as to the result of their venture.

The Corporation of Birmingham are just at this critical point. They have determined to try the temper of the Money Market by issuing, through the Bank of England, corporation stock to the amount of two millions sterling, to form the initial subscription for a corporation loan. The Municipality of the Midland capital owe on mortgage various amounts borrowed from time to time, including £1,130,000 advanced by the Public Works Loan Commissioners, and they wish to be enabled, by the fresh issue of stock of a uniform class, to clear off these outstanding liabilities, and to raise certain sums that will be immediately required. The Bank of England authorities have consented to issue the new stock on certain terms which, although rather high, the Finance Committee were disposed to accept, in view of the advantages to be gained by issuing the stock by such an agency. The stock is not to be thrown upon the market hap-hazard; it will be issued at a minimum price of 98, and be made redeemable in 60 years. Judging from the experience of the Liverpool Corporation, whose 3½ per cent. stock now stands at 102, the Birmingham stock might at least be expected to be taken at par, when it would result in an economy of between £1500 and £1600 per annum to the town, as compared with their existing methods of borrowing. If a premium of £1 can be secured, to be paid to the credit of the sinking-fund, the town will realize £2500 instead of £1600 per annum by way of profit on the transaction. By issuing the stock at 98 instead of at par, the Corporation appear to indicate that they are in earnest in their desire to float their loan even at a small sacrifice; which, however, we do not believe they will be called upon to make. They are distinctly right in retaining the amount of control over the debt implicated in their retention of the right of redemption at a stated time, in spite of the fact that the stock is thereby made slightly dearer to them. But, as we have already remarked, there is no reason to suppose that, with such splendid security as they have to offer, the Corporation will have cause to be other than satisfied with the result of their venture.

It must not be forgotten that the intended issue is quite experimental in character. The Corporation are in no way bound to submit to the verdict of the London Stock Exchange, should it prove unfavourable to their scheme. It is not in them to command success. By the time the subscription is actually opened—which will probably be about the middle of January next—causes yet unsuspected may operate to the prejudice of all classes of investments, for the fluctuations in the value of stocks and shares are even less susceptible of prevision than the weather; but against the worst effects of such disturbances the Corporation are already protected. They can always get money from the Public Works Loan Commissioners, as they have done before, although such a failure as the necessity of reverting to this procedure would mean, would be sincerely regretted beyond the limits of the borough. As a matter of broad principle, large and important towns like Birmingham should be able to stand alone, and raise such funds as they may require without the aid of the Central Authority. There is no reason why Government credit should be drawn upon when the improvement of streets, or the extension of gas and water works, is required in a locality boasting as large a population as many an independent nationality can muster. It is conceivably safer and better for small towns to draw money for capital purposes under the control and by the machinery of the State; but it is as unfair to tax the pre-occupied Executive with the affairs of communities well able to provide for themselves, as it is to require the latter to conform in all cases to regulations that are justly applicable to less robust organizations.

As to the manner of placing the proposed loan, we agree with the Finance Committee, as against the more effusively philanthropic members of the Council who wish to see a more distinctive local element imported into it from the beginning. It is most desirable to afford means whereby the savings of provident townspeople may be readily invested in the loans of their own local government. The advantages of such a practice, if it can be established, need not be further enlarged upon here; but it must be properly managed with strict regard to all the circumstances of the case. First of all, it is the obvious duty of those having the responsibility of issuing a corporate loan, to do so in the way best calculated to obtain the highest quotation for it. When this is done, in the interests alike of the town and of its thrifty inhabitants, arrangements may subsequently be made whereby dealings in the

loan, or in the future subscriptions to it, shall be facilitated in any of the ways known to benevolent financiers. This is the right course to pursue, and if the Finance Committee do not eventually lose sight of their promise to institute means to enable a workman to purchase corporation stock as easily as he can open an account with Her Majesty through the Post-Office Savings Bank, none will have cause to regret that they have considered it necessary to avail themselves of the assistance of the Bank of England in the first subscription to their new municipal loan.

The Bill to be promoted in the ensuing session by the South Metropolitan Company is brief but pregnant. The Company desire to raise one million pounds of additional "C" capital, to be classed with the capital under the same heading in the scheme for the amalgamation of the South Metropolitan and Phœnix Companies, sanctioned by an Order in Council on the 18th of March last. By the provisions of this scheme, the "C" capital partakes with the other classes up to eleven per cent. dividend, beyond which it will receive one-half of any increased dividend, the other half going to the "A" shares. The new capital will, of course, be sold by auction or tender, as provided by the Company's Act of 1876. Power to borrow on mortgage a sum equal to one-fourth part of the paid-up capital for the time being is included in the Bill. The Company seek to acquire about 140 acres of land on the river side at Blackwall Point, in the parish of Greenwich, for the purpose of constructing a new manufacturing station thereon, and also for manufacturing and converting the residual products of their own or any other Company's works. The Company also desire power to supply gas in bulk beyond their own limits, and to break up roads and streets and lay pipes in such outside districts.

There is some danger that the Lincoln Bill, authorizing the acquisition by the Corporation of the undertaking of the Gas Company, will have to be dropped. The statutory town's meeting for the consideration of the Bill has been held, and it was then rejected by an overwhelming majority. The meeting was said to have been largely composed of non-ratepayers, and was extremely noisy, especially after the delivery of several inflammatory speeches by opponents of the transfer. As usual in such cases, the advantages to be derived by the Gas Company were much magnified by these orators, who did their best to excite the indignation of the groundlings by the recital of the large sums that were to be taken out of the rates to compensate the Directors, and in other ways helped to show how well qualified a public meeting is to deal with questions of finance. After the show of hands had been taken, a poll was demanded, and it will, consequently, be seen whether the majority of the ratepayers are content to be led by their own representatives or by the blatant speakers against the Bill at the meeting. Meanwhile the Council have decided to seal the petition for the Bill, and the matter will, therefore, go on for the present—at least until the popular vote has been declared. Unfortunately for the Council, they are in the interim acting at their own risk, for a refusal of the ratepayers to sanction their past or present proceedings will be attended with many unpleasant results. For their sakes it may be hoped that the recent meeting was in reality the insignificant affair it was described as being by the Mayor, who it is needless to say is an advocate of the proposed transaction, but is equally anxious to act only in accordance with the real wishes of the people.

The Swansea Gaslight Company have quite recently attempted to satisfy the Town Council in the matter of the public lighting, by consenting to reduce the price charged for the street-lamps to the Local Authority from £3 1s. 8d. to £2 15s. per lamp per annum, giving 92 hours extra lighting without charge, and also substituting 4½ cubic feet for the former 4 cubic feet per hour burners. To any reasonable being it would appear that these concessions are not only liberal in themselves, but even more strikingly testify to the desire of the Directors of the Company to conciliate the Council. Far different is the manner in which the latter body regard the action of the Company. They consider the reduction in the price of gas to the public lamps, and also the remission of threepence per thousand feet to private consumers, which is to take effect from the beginning of the New Year, as totally inadequate to meet the just requirements of the public. The Local Authority want to have the gas undertaking in their own hands, and therefore, aided and abetted by a section of the local Press, they take every opportunity of disparaging the gas and vilifying the present management; and the ratepayers are stirred up by the publication of parallels drawn from Metropolitan and other sources to show that Swansea gas at 3s. 3d. per thousand cubic feet is excessively high-priced. We are used to this style of argument from provincial orators, who, when agitating for a reduction in the price of gas at Great Winklebury, or some other equally important market town, never fail to inform their hearers that gas is sold at Leeds or Sheffield, or other strictly comparable place, at about half the price paid for their own supply. Of course it would be a pleasure to the Swansea Town Council to see the Gas Company selling gas at a price that would render dividends impossible; but if the undertaking becomes public property, how much will the price be at once reduced? As to the management of the gas supply, the public are perhaps better served by the Company than they would be by the Council, unless the latter change their system of doing business. The management of the property at present belonging to the Council, as representing the town, is not so brilliantly successful that the gas consumers could regard without some trepidation a transfer of their interests to such hands. However, the inevitable course will probably be pursued here as elsewhere—all kinds of complaints against, and popular discontent with the gas supply will be fostered by the Council until they take charge of the business, out of pure charity, and only to save its life; whereupon clamour must cease, and every ratepayer must be satisfied with the treatment he will receive. Gas Companies *always* mismanage their property; Gas Committees never do.

Warrington offers a good illustration of the necessity for Corporation gas management to extend the consumption of gas by all possible means. Although the Corporation have not fallen into the error of allotting any proportion of the gas profits to aid the rates, or for any other purpose of a similar nature, the price of their 18·36-candle gas is 3s. 6d. per thousand cubic feet, which appears to many members of the Council to be unnecessarily high. The Gas Committee are, of course, anxious to produce gas as cheaply as possible, but in addition to their inherited capital charges, they are engaged in constructing entirely new works, the whole cost of which is as yet unproductive. When the new station is completed, the Committee will be able to manufacture gas there at a lower cost than is possible at their old works, and it will then become essential to make a slight reduction in price, and to use every endeavour to increase the consumption of their gas, in order that the enlarged capital liabilities of the undertaking may be satisfactorily met, and at the same time the gas rendered so cheap that the great advantages of the gas supply being under Corporation control may be more apparent to the local public than it is at present. The Gas Committee must be credited with the desire to make themselves acquainted with the latest improvement in gas apparatus, as they appointed a Sub-Committee to visit the recent Glasgow Exhibition, and report on what they saw. The deputation returned with a very good opinion of various kinds of gas-burners and cooking stoves, but with a very bad impression of the electric light. This shows how people viewing the same object from various standpoints may arrive at different conclusions. Some persons—not being members of a Gas Committee, or otherwise specially interested in gas lighting—have recorded their opinion that the electric light "held its own" at Glasgow. It may perhaps be said that gas sympathizers, accustomed to steady and diffused light, are apt to disparage a method of lighting which does not claim these among its peculiar advantages; while electricians may disdain these points as unworthy of their serious consideration, probably because of their inability to secure them. In this way it is possible to reconcile the two conflicting opinions, if it is really considered worth troubling about.

We take this opportunity of informing our readers that this is the last "Circular to Gas Companies" which will appear in the JOURNAL. The title has been retained as a relic of the early days of this publication, when it was strictly applicable to the semi-private nature of the contents of these columns. The character of our comments on gas affairs has, however, become so altered in the course of time, that it is felt that the old title is no longer suitable. Gas polity is no more the exclusive concern of Gas Companies, and it is inadvisable to continue a title which, at the first glance, appears to restrict the application of our remarks in a manner which has long ceased to characterize them. Henceforth, although we shall continue to devote the first part of the JOURNAL to editorial reviews of gas matters in general, the broader field which the force of current events compels us to survey, will be best left uncatalogued

under any precise designation. No specific title will therefore, in future, limit our editorial grasp of subjects connected with the gas and cognate industries; but we shall take the liberty of dealing in these columns with anything and everything which we may consider of interest to gas manufacturers and consumers, to whom, at the close of the year of grace 1880, we wish all prosperity in the year that is about to begin.

Water and Sanitary Notes.

A REPORT is current that the Metropolitan Board of Works will endeavour to induce the Government to adopt a scheme of regulation instead of purchase, with respect to the undertakings of the London Water Companies. It is quite possible a majority of the Metropolitan Board are beginning to perceive that the management of the water supply is a much more formidable affair than has been generally understood. That the Metropolitan Board could not, alone and unassisted, perform the functions at present discharged by the eight London Water Companies is perfectly certain. Supposing a Water Trust to be formed, consisting mainly of representatives from the Metropolitan Board and the Corporation, the members of the former body selected to serve on the Trust would require to be released from all their other duties, and would be practically withdrawn from the work of the parent Board. To enlarge the Metropolitan Board, so as to make up for the deficiency thus occasioned, would be a clumsy expedient. A Water Trust formed without reference to the Metropolitan Board or the Corporation, might deal effectually with the water supply; but the Metropolitan Board cannot be expected to look upon a scheme of this kind with any degree of favour. On the whole, there are very good reasons why the Metropolitan Board should prefer a Regulation Bill to one of purchase. The *Echo*, true to its usual policy, is greatly annoyed at the prospect of such a Bill, and characterizes the proceedings on this subject at the Metropolitan Board as "a little conspiracy." We may be allowed to express our belief that if practical effect should ever be given to the flaming theories advocated by our contemporary in respect to the Water Supply and the Local Government of London, the inhabitants of the Metropolis will have great cause to complain. The difference between London and the largest of the provincial towns of the kingdom is so vast that any attempt to deal with the Metropolis on the plan of the provincial municipalities is to be deprecated, as fraught with dire probabilities of mischief and confusion.

The discrepancy in the analyses showing the amount of solid matter in the water supplied by the Kent Company is explained in Lieut.-Col. Bolton's current report, by the circumstance that the Company have several wells, and among these there is some difference as to the degree of hardness and the amount of solid matter. Although the supply is, to a certain extent, mixed in the mains, it is necessary, if uniform results are to be obtained, that all the samples for analysis should be taken at the same place and at the same time. Truth is generally understood to exist at the bottom of a well; but it appears that where there are many wells it is difficult to get at the truth. However, the Kent Company, who have taken the trouble to explain the matter, point out the fact that whatever variation may be discovered in the nature of their supply, all the varieties of their water are good.

Lieut.-Col. Bolton continues his accustomed statement that "all the Companies are moving in the matter" of the constant supply, "except the Grand Junction Company." The best he can say of this Company at present is, that they "have resolved" upon energetic action, and "propose to "begin" with sundry building estates and districts. At a later date the Company hope to convert portions of their older districts to the constant system, but they look forward to considerable opposition in carrying out this design. The Lambeth Company are said to experience great difficulty in getting landlords and tenants to make the necessary alterations in their fittings. The Chelsea Company are giving the constant supply on all new estates and new lines of streets, though, judging by the very few applications made for such supply, there appears to be little desire to obtain it, either on the part of public authorities or private consumers.

With reference to the Southwark and Vauxhall Company, Lieut.-Col. Bolton makes a remark that in the event of this Company being at any time unable to deliver a sufficient quantity of water to their district, assistance might be afforded by the other Companies whose works are south of the Thames, who would thus jointly contribute some six or seven million gallons of water per diem. It would have saved much inconvenience and complaint, if an arrangement of this kind had been acted upon a few years ago, when the filter-beds of the Southwark and Vauxhall Company were partially choked by the sudden growth of vegetable matter during an exceptionally hot period of summer weather. North of the Thames, some of the Companies are, we believe, in a position to feed each other's mains in the event of an emergency. Lieut.-Col. Bolton observes that any arrangement of this kind must be on a voluntary basis, as there is no power to compel the Companies to assist each other. We hope nothing will arise in the future to show that such compulsion is necessary.

The Metropolitan Municipal Association, meeting under the presidency of Mr. E. J. Watherston, with Mr. J. Beal for Honorary Secretary, are prepared to show Sir W. Harcourt what to do with the Metropolitan Water Question. A letter is to be addressed to the Home Secretary, stating that a representative body created out of the Metropolitan Board and the City Corporation "will not command public confi-"dence." Failing the adoption of direct representation, it is suggested that a Parliamentary Commission should be appointed, "composed of very eminent men," with power to acquire the undertakings of the Water Companies, or to establish a new source of supply. It is proposed that this Commission should last until a Municipality for London, or a representative Water Board, is created to take up their functions. Still further to help the Home Secretary, the names are given of individuals suitable to serve on the Commission, beginning with the Speaker of the House of Commons, and finishing with "a leading member of the Stock Exchange." Why this last, we are puzzled to know, unless he is to "bear" the market, and keep down the price of water shares. Concerning the Vestry Delegates assembling at St. Martin's-in-the-Fields, Mr. Watherston desires to see them re-appointed. The proposal for "direct representation" in the constitution of the Water Trust has created a division in the camp, and a fresh start must be made, if there is to be anything like a general delegation from the Vestries and District Boards of the Metropolis on the subject of the water supply. The expectation that the Government will soon attempt to introduce a new system of government for the Metropolis is strongly entertained by the leading members of the Metropolitan Municipal Association, the hope being based upon "the emphatic declaration" made in respect to this subject by Mr. Childers, at the recently-held meeting of the Chelsea constituency.

The immense practical improvement effected during a recent period in the operation of boring to great depths offers peculiar facilities for the utilizing of underground waters—a matter of especial value in those districts where other sources of supply are either scanty or remote. The improved system of boring is happily associated in these days with that accurate knowledge of geological phenomena which in particular cases makes the search for water an enterprise of comparative certainty. Two examples of this description occur at the present time, one being at Fulwood and the other at Walton-le-Dale, both in the vicinity of Preston, the former locality lying to the north-west of that town, and the latter to the south-east. In each case the Local Authorities were advised by Mr. C. E. De Rance, F.G.S., a member of the Geological Survey, as to the site to be chosen, the probable depth at which water would be found, and the volume and quality of the water that would be obtained. The professional counsel thus given has been in each case most remarkably verified. The Fulwood boring was begun on the 5th of October. Mr. De Rance expected that the gravel, sand, and clay would give place to actual rock at a depth of 112 feet. As a fact, the rock was reached at a depth of 121 feet, being only 9 feet deeper than the anticipation. A short time back the boring had reached a depth of over 160 feet, the water standing at 90 feet from the surface. When a depth of 200 feet is reached, it is intended to have a chemical analysis made, and if this proves satisfactory operations will be continued to the full extent advised, which is 300 feet. At this depth Mr. De Rance expects that a pure and abundant supply of water will be met with. At Walton-le-Dale the operations commenced as far back as the autumn of last year, and a trial boring was carried down to a depth of 300 feet. The supply of water thus obtained was found, after pumping had been carried on night and day for three weeks, to amount to 60,000 gallons per diem. The total cost of boring and testing was under £400. Samples forwarded to Dr. C. Meymott Tidy were reported upon in the most favourable terms. The prospect being in every respect satisfactory, application was made to the Local Government Board for permission to borrow £10,000 in

order to carry out the entire project, according to a plan prepared by Mr. C. Tomlinson, Engineer, of Rotherham. At the official inquiry into the subject of the application, conducted by Mr. R. Morgan, Mr. De Rance gave evidence to the effect that the yield from a well 300 feet deep might be expected to amount to at least 400,000 gallons per diem. The scheme being approved by the Local Government Board, the requisite contracts were entered into, and operations were actively commenced in October last. At a depth of barely 50 feet from the surface, a supply of about 100,000 gallons of water per diem has been reached, and the well will be carried down to a depth which will be regulated by the amount of water met with. A reservoir is being constructed, and the requisite boilers, engines, and pumps are being made. The boon to the district, where the water supply has hitherto been scanty and uncertain, will be very great.

GAS LIGHTING AND VENTILATION.

Among the other delinquencies of house builders, their total disregard of the necessity of ventilating living and sleeping rooms is not the least. It is enough to shake the convictions of the most resolute believer in the all-sufficiency of public opinion to effect desirable reforms in our social organization, to observe how builders continue to make profit by building close and stuffy, or bleak and draughty habitations, although the people who live in them have daily experiences of their discomfort and danger. Year after year people endure a style of building houses which makes the supply of fresh air to the interior depend entirely on the imperfect fitting of the doors and windows. By day, at this time of the year, roaring fires have generally to be kept up to protect the long-suffering householder from the effect of the draughts, which in too many cases appear to strike an inmate of a modern room in whatever part of it he may happen to seat himself; while at night, when the gas is lighted, the temperature of the apartment, which has obstinately remained at about 55° Fahr. during the day, speedily mounts up to something over 70°, and when a visitor is admitted he is saluted with a puff of suffocating fumes. It is usual to lay the blame for this state of things upon the gas, which has been a firm friend to the builder in this respect. When the leaks and crevices which are competent to fill a room with draughts by day are found insufficient to supply it with pure air, and also to remove the respired air and products of the combustion of gas by night, it has been so much the custom to look upon gas as the sole cause, that the modern school of æsthetic decorators and furniture mongers, who have taken upon themselves to teach the builder his business in everything else, implicitly follow his lead in this, and endeavour, by discrediting and tabooing gas as inartistic, to avoid the necessity of discovering a thorough system of ventilation for dwelling-houses. The new school of decorators are, in fact, worse foes to gas than the ordinary builder, for while he does not object to it more actively than by constructing rooms in which it can only be burnt at the risk of asphyxiating the inmates, the high-art enthusiasts are quite incompetent to deal with it on rational principles, as, according to their own ideas, they glory in doing with furniture, and they therefore conceal their ignorance of its capabilities by abusing it in all the high-flown phraseology of the school. It was painful to hear such a man as Mr. R. W. Edis, F.R.I.B.A., in the course of the otherwise very sensible lectures on house decoration delivered by him to the Society of Arts last spring, revile London gas in such terms as "vile compound" and the like, which only served to show that, although perhaps a good decorator, he knew nothing whatever about gas illumination. In no other class than that of which Mr. Edis is such a conspicuous ornament is contempt of ignorant outsiders, who attempt to criticize the work of the initiated, carried nearer to the verge of priggishness, and it is no more than a fair reprisal if we suggest that Mr. Edis, when next irritated by a Philistine who does not believe in "dadoes," and is blind to the beauty of blue china, should remember that the disposition to revile the unintelligible is also to be found in himself.

We do not, however, intend on the present occasion to deal with the absurdity of that kind of modern art-teaching which is prone to sneer at anything intended for domestic use that does not date from the reign of Queen Anne, further than to remark that although books on decoration have lately been as plentiful as cookery manuals, the writers do not appear to be capable of telling their readers how to make the best of the advantages offered by the material progress of the day, as compared with the state of the age to which they are so fond of referring. We hear so much of the fine old houses of the early Georgian era, and the decorated interiors of that and a slightly prior time, but we are not so frequently reminded that in those days sanitary science was not in existence, nor are the modern worshippers of the past glories of Bloomsbury and Soho themselves sufficiently imbued with the sanitary sense. Sanitation, of course, means more than drainage. The ventilation of dwelling-houses is a very important branch of what has been expanded into the "science" so named. It is not clear, by the way, that the specializing tendency of the time, which separates human intelligent effort into numberless "sciences," each with its peculiar prophets and their followers, is of unequivocal advantage. There is always, in such cases, the disposition to form a "ring" of interested specialists round the subject, and thus to really narrow the benefits of its application by spreading the impression that only those who can utter the password are competent to deal with the matter. Be this as it may, we find the patent fact that the sanitarians of the present day are a body quite distinct from the authorities on matters of house furnishing, and the questions cognate thereto, and this is much to be regretted. The subject of ventilation is one on which a fusion of sanitary and decorative principles is desirable, for we find, on the one hand, sanitarians advocating arrangements from their own point of view alone, while, on the other hand, decorators might be pardoned for dismissing some of the proposals of the former on the score of their uncompromising presentment. We hold firmly to the opinion that where health and taste run counter to one another, the latter should give way; but, again, such instances of utter antagonism are few. Where one interest clashes with the other, it is, by the nature of things, the artistic faculty which should be called upon to make the necessary adjustment. Art can beautify the necessities of life, or it is no art, but its misleading counterfeit, and its professors are quacks. Now we may put the question—Is the art which cannot utilize gaslight and ignores ventilation (among other things) true or false? None will contend that ventilation is unnecessary, and as for the necessity of gas lighting for town populations, the same building which echoed to Mr. Edis's denunciation of gas, has more recently heard Dr. Alfred Carpenter maintain that no town without gas can carry on its work in the world. One preacher condemns that which another seeks to have infinitely diffused. By the testimony of facts we must acknowledge that the latter has a better insight into the truth in this particular. Then, if houses are properly ventilated, gas may be burnt therein without the discomfort attending its use where ventilation is not thought of; and it is even possible to say that, by a proper use of gas, ventilation may be more perfectly secured than by any other means.

We have before us a pamphlet by Mr. Lawson Tait, F.R.C.S., reprinted from the Transactions of the Birmingham Philosophical Society, in which the author describes and figures an arrangement embodying the principle of the Tobin tube, for the ventilation more especially of bed-rooms, but which may, of course, apply to other apartments. A tube of thin sheet metal, about 4 feet in height, is fixed in a corner of the room, with an elbow at its lower end communicating through the wall with the outer air. This elbow is warmed by an atmospheric gas-burner, and is packed loosely with crumpled iron wire or metal clippings. The pipe is encased by another, similarly constructed, which is open at the bottom but closed at the top, where it terminates about an inch below the top of the inner tube. A branch pipe from the upper portion of the outer pipe communicates with the air. The action of this apparatus is easily understood. Fresh air enters by the inner pipe, and is at once warmed and directed to the upper part of the room, displacing the foul air, which descends and enters the bottom of the annular tube, and passes out at the upper branch pipe. Thus by the aid of a little gas heat the air of an apartment fitted with this arrangement is continually being changed, while the room itself is kept pleasantly warm. As to the appearance of this description of ventilating stove, nothing can, of course, be said. It is not necessarily ugly, but if it answers its purpose, as the author contends that it does, it is surely a fit subject for decorative treatment. That gas can be anything else than a nuisance in a living or sleeping apartment will perhaps be news to many; but we, who believe that its more extended capabilities are only now being explored, welcome the smallest addition to its acknowledged uses, especially in the direction of household sanitation.

Mr. Henry Webb, for many years one of the Auditors of the Commercial Gas Company, died on the 30th ult., aged 76 years.

As an example of the estimation in which the stock of the Sheffield United Gas Company is held in the borough, it may be stated that on Tuesday last Mr. Nicholson submitted for sale by auction £420 class of "C" stock in the Company. For it £190 per £100 was bid; but as no higher price was offered, the lot was withdrawn.

We (*Manchester Guardian*) are informed that the memorial for the mitigation of the sentence on Frederick Hepton, late Chief Clerk and Cashier in the Water-Works Department of the Manchester Corporation, has received 6000 signatures, and that it will be presented to the Home Secretary by Mr. John Slagg, M.P., early in January.

The Water Supply of Consett.—At the last monthly meeting of the Benfieldside Local Board, the Chairman (Mr. J. Annandale, jun.), said the Clerk had written to the Consett Water Company, calling their attention to the report of Mr. Stock, the County Analyst, and requesting to be informed if it was their intention to take steps to filter the water supplied to the public. A similar question had been asked by the Consett Local Board, but the reply in each case was the same—that they believed the water submitted to Mr. Stock was taken from the reservoir at a time when there was flood water in it; that, in consequence, the water contained a larger quantity of vegetable matter than was usually found; but that, at the same time, the Company would do their best to make the water as pure as possible. Dr. Renton said the death-rate of the township had never been lower than it was at present, and if the water had been impure, as represented by Mr. Stock, they might have expected to find some demonstration of the fact in the health of the people. Mr. Carss said the Analyst told them that the water was unfit to drink. The Chairman said according to the Company's Act they were bound to supply pure and wholesome water. What was the penalty if they did not do so? Mr. Carss said the Local Government Board could compel the Company to supply pure water. If the Company failed to do so, then, with the authority of the Local Government Board, the Sanitary Authorities in the district could take the matter out of their hands altogether, and provide a separate supply. He thought that three Local Boards in the district ought to take joint action in calling the attention of the Local Government Board to the present unsatisfactory supply of water, and he concluded by moving a resolution to this effect. Mr. Dowson said the Consett Local Board had already sent a copy of Mr. Stock's report to the Local Government Board, and asked if any reply had been received? Mr. Smith said none had arrived up to the present time. After some further discussion, it was decided to let the matter stand over until next month, by which time it is expected a reply will be received from the Local Government Board.

Notes.

[This column is intended to contain miscellaneous memoranda on topics of general professional interest to our readers. We shall be glad to receive for insertion in it any scraps of information, observations of facts, or descriptions of apparatus, &c., which may be worth publication, and yet may not be considered suitable for our "Correspondence" column.]

Conversion of Non-Luminous into Luminous Gas-Flames.

At the recent meeting of the German Association of Naturalists, at Dantzic, Dr. Blockmann raised the question of the reason why the non-luminous gas-flame of a Bunsen burner becomes luminous when the mixture of air and gas is heated. As reported in the *Chemiker Zeitung*, Dr. Blockmann stated that if on the top of a Bunsen burner a platinum tube is placed, and this tube is heated to dull redness by another burner, the previously non-luminous mixture of air and gas will become luminous, even to the extent of ordinary coal gas. The ordinary explanation of the phenomenon is that, whereas luminous gases may be made to burn non-luminously by the addition of air, nitrogen, aqueous vapour, or other means for the withdrawal of heat, conversely non-luminous flames can be made luminous by the addition of heat. This explanation did not satisfy Dr. Blockmann, and he therefore analyzed the mixture before and after heating, in order to determine whether or not any chemical change was caused by that operation. Before heating, the mixture contained about 60 per cent. of air and 40 per cent. of coal gas. After passing through the heated tube the greater part of the hydrogen and all the oxygen had disappeared, the light and heavy hydrocarbons of the gas showed only a slight decrease, and the carbonic oxide a slight increase. The products of combustion were 22·2 volumes of steam and 1·4 volumes of carbonic acid. The arrangement was now changed, the same platinum that had been used as a tube was rolled in a spiral form, and packed into a refractory glass tube of the same diameter as the Bunsen burner. The gas mixture was then passed through and the tube heated, when, even by daylight, the platinum foil was seen to remain red hot after the external flame was withdrawn, and water collected in drops in the cooler part of the tube. The gas mixture which had passed over the heated platinum contained only 20 per cent. of inflammable constituents, with 55 per cent. of nitrogen and 25 per cent. of products of combustion, and was generally on the verge of ignition. The flame was non-luminous, and appeared to have been partly destroyed, nor could it be made luminous by warming from the outside. Again, after mixing gas and air in a holder, it could not be rendered luminous by passing it through a heated tube, however much the tube was heated. From these and other considerations the experimenter became convinced that the mixture of gas and air could not be rendered luminous by heating, but that the apparent effect was due to the fact that, by heating the tube, the movement of the mixture inside was affected so that the air was partially or entirely prevented from entering the holes at its base, and that therefore the so-called luminous mixture was really the pure gas from the pipe.

Another New Gas-Engine.

Mr. W. Foulis, the Engineer-in-Chief to the Glasgow Corporation Gas Commissioners, will shortly bring before the public a new gas-engine of his invention. The machine may be said to have already passed the experimental stage; for a number of professional gentlemen, who have been permitted to see a model at work, declare that it is a decided step in advance in this line of invention. The engine is an example of valvular arrangements being reduced to a minimum, and one of its essential features is that it partakes largely of the character of a heat engine, and does not depend so much on the explosive action of the mixture of gas and atmospheric air as is common in most other types of gas-engines. Very shortly a new engine ready for actual use, made from Mr. Foulis's designs, will be finished, when a fuller account of its construction, together with results in action, will be given.

A Metallic Gas Fire.

Mr. James Hislop, the Manager of the Partick, Hillhead, and Maryhill Gas Company, has just devised a new form of burner for gas fires as used in open grates with asbestos composition. The burner, or, as Mr. Hislop calls it, the "metallic gas fire," has a dark brick-red colour, which seems to indicate that aluminous oxide of iron is used in its composition; but whether or not there is any fire-clay along with it we are unable to say. It is the case, however, that after being used for several months the burners become exceedingly hard, almost like cast iron, or, better still, like a very hard-burned fire-clay. In shape the burners are oblong masses, hollow internally, and having in front and at the ends a series of terraces, in the angles of which there are the perforations for the exit of the mixture of air and gas. So far as they have been used hitherto, these burners have proved to be very successful; they are entirely free from smell. Mr. Hislop, who has been studying and experimenting on this matter for a number of years, seems to have fallen upon a most ingenious method of burning the gas. It is certain he manages to heat the gas to a great temperature before combustion; and he claims to have succeeded in attaining the maximum of heat with the minimum of gas consumption. The burner is scientifically adjusted so as to be suitable for the burning of either Scotch or English gas.

The Utilization of Small Coal.

A suggestion appeared in a recent number of the *Newcastle Chronicle* with respect to the conditions under which Wallsend coal is brought into the London market and to other ports. Much of the coal of this class is very small, and when screened at the pit's mouth, previous to shipment, as much as 30 to 40 per cent. of small is sometimes taken out of it. Again, in the dealers yards, before being retailed, it is subjected to further screening, which takes out about 20 per cent. Hence not more than 50 per cent. of the coal obtained from the Durham pits is actually sold to householders for domestic use, the remainder being disposed of at a much lower price. It is suggested that it may not be really necessary to screen the coal prior to shipment, but that the difference in the amount of loss between double-screened and single-screened coal may perhaps pay for the carriage of the whole, taking account of the lower cost at which through-and-through coal can be supplied. Otherwise it is proposed to partially carbonize at the pit's mouth the small coal taken out, so as to make a superior kind of coke or consolidated moulded fuel, saleable weight for weight at equal prices with the large coal. It is not intended to carry the carbonizing process very far—merely to the extent required to cause the small coal to cement itself together by the aid of the tar, just as it is caused to flow. There would be in the process an evolution of gas, which, in default of other uses, might be caused to heat the retorts; and any ammoniacal liquor distilled over would also be preserved. The fuel thus made would, in reality, be coal of a less bituminous character than that employed in its fabrication, and it might, of course, be moulded in any required sizes. As this proposal requires certain appliances, not at present in use, to be specially devised, an alternative scheme is that of carbonizing the small coal direct to coke, but without carrying the process quite to the extent practised when gas is sought as the chief product of the destructive distillation of coal. It is considered that the Durham coal refuse, for such it practically is at present, will, in either of these two ways, become very much more valuable than the small coal of South Wales, of which patent fuel is made. The proposals somewhat lack novelty, but they go to show that an old source of loss to the fuel producer and consumer of the country is still unchecked.

The Composition of Condensed Water.

According to Mr. Isherwood, Chief Engineer in the United States Navy—a communication from whom on results of certain experiments with a tubulous boiler of the "Roots" class appears in the *Journal of the Franklin Institute* of the current month—an alkaline feed water, the alkalinity, of which was, however, subject to destruction when the solid matters dissolved in it were calcined, exerted a curious effect on the iron of which the boiler and surface condenser were composed. An examination of the water of condensation drawn from the surface condenser showed it to be strongly acid, and containing iron, while the water in the boiler from which it was distilled was alkaline and free from iron. The acid was found to be carbonic acid, and the iron was in the form of carbonate of iron, and evidently came from the iron tubes of the surface condenser. The action of the distilled water on these tubes was so rapid, that although when condensed the water was perfectly clear, after standing one night in the condenser it was discoloured and ochreous in the morning. This water, after the removal of the acid and iron, was absolutely pure. If the water was allowed to stand, the acid left it spontaneously, and at the end of about 15 days was almost entirely gone. Mr. Isherwood states that he has observed the same destructive action of the water of condensation on the cast-iron casing of surface condensers of other engines, due to the gaseous acids brought over with the steam from the boiler, and dissolved anew in the distilled water. Hence it is quite an error to suppose that the condensed water derived from a surface condenser of an engine in ordinary use is pure water because it has been distilled, even if it be not greasy; it is, in fact, acid and ochreous.

Lightning a Cause of Colliery Explosions.

An important communication by Mr. Canning, of the Gas-Works, Newport, Mon., on the subject of colliery explosions, appeared in the *Western Daily Press* of the 21st inst. The writer visited the Risca pit on the day after the disastrous explosion in July last, and became suspicious, from the statements of residents in that locality, that the accident in question was due to a discharge of atmospheric electricity into the mine. In conjunction with Mr. Thomas, the writer conducted during the following month a series of experiments to determine the action of electrical currents in wires when surrounded with explosive gaseous mixtures, with the view of estimating the probable action on the unstable atmosphere of fiery mines of the hoisting wire, and the continuous metallic conductions between the interior of such mines and the external air, when these wires are charged, directly or by induction, with electricity at a high potential. The experiments were admirably adapted to attain the desired end, and, from their simplicity, can be easily repeated by any one desirous of satisfying himself of the accuracy of Mr. Canning's observations. He used an ordinary induction coil and three Grove's cells for the production of the electricity. The wires from the coil terminated in small brass knobs. When the coil was connected up in the usual way, a stream of coal gas from a burner attached to a flexible tube was ignited on approaching the insulated wire. When the wire was not insulated, the same effect was produced, with the difference that in this case the ignition was effected by a lump of coal placed in contact with the wire. Small coal in the neighbourhood of the charged wire gave rise to a continued exchange of sparks. Finally, a box containing an explosive mixture of gas and air was exploded by the electrical discharge between a wire and a quantity of coal dust sprinkled over the bottom of the box. This evidence appeared so conclusive to Mr. Canning that, in conjunction with Mr. Thomas, he has obtained a patent for a protecting roof to cover colliery heads, to prevent direct or induced electrical dis-

charges taking place in the winding wire, and also for a discharging apparatus for taking off electricity from such wires when the roof is not used. It will be remembered that Mr. W. H. Preece expressed his conviction that lightning was the agent that brought about the Risca explosion, and he has also stated his opinion concerning the danger of introducing the electric light, or, indeed, any apparatus requiring intense electrical force, into mines where fiery mixtures of hydrocarbon gas and air may be suspected. Mr. Canning quotes this opinion of Mr. W. H. Preece, which he considers has been amply justified by his own observation, that a spark is not always necessary in order to fire a stream of ordinary gas.

Communicated Article.

FOG AND SMOKE.

By Mr. H. Leicester Greville, F.I.C.

The grumblings of the British Public concerning the heavy fogs which, at certain periods of the year, infest London, in common with other cities where bituminous coal is burned in large quantities, have at length taken a tangible form. By the constitution of a Fog and Smoke Committee, it is to be hoped that, if no absolute cure for an intolerable nuisance is discovered, the scientific bearings of the question will be discussed, and many valuable suggestions made. The Committee starts with the double advantage of possessing scientific men of eminence among its members, and of being under Royal patronage, and will therefore no doubt not only perform useful work, but command the attention of the public to its labours. It is well to see the enrolment of such a practical man as Mr. Harris on the Committee, for it is advisable that the gas companies should have a suitable representative. The interest they naturally take in the matter has been spoken of, inasmuch as it is believed that the present discussion will tend to increase the consumption of coke as fuel for domestic purposes, and make the employment of gas fires more popular. It will thus extend that consumption of gas during the day which is considered so desirable by gas companies.

In studying the general question of fog and smoke, the evidence upon the connection of the two has first to be considered; and, secondly, the suggestions for preventing their occurrence. With regard to the origin of fogs, they are, no doubt, peculiar to districts in which exist large congregations of houses where bituminous coal is consumed. The white mist which is occasionally met with in country districts is totally different in its character from the orange-coloured, dense vapours which occasion bronchial irritation, and materially increase the average death-rate during the period of their continuance. The country mist is in all probability nothing more than partially condensed aqueous vapour. It is, in reality, an atmosphere highly charged with moisture, cooled to a degree sufficient to separate a large proportion of the aqueous vapour in the form of fine particles of water—a condition analogous to that which is produced when a jet of steam is blown into the air. In the case of the regular city fog, it appears probable that the same basis exists, but the condensed water particles are enveloped in films of condensed hydrocarbons, having their origin in the incomplete combustion of the bituminous coal used in ordinary domestic fireplaces. This hydrocarbon film surrounding each particle of condensed water retards the coalition of the individual particles, and consequently causes the persistency of the fog to be greater than that of simple mist. It is to the presence of these tarry hydrocarbons, in fact, that fog not only owes its peculiar persistency, but also its specially irritating action on the throat and lungs. In addition to the condensed hydrocarbons in fog, a certain amount of solid and finely-divided carbon particles is present, which tends to increase its objectionable character.

As to the origin of fog, it can thus be intimately connected with the smoke and other products arising from the incomplete combustion of bituminous coals. On the question of the particular atmospheric conditions favourable to the accumulation of fogs, there is less known; a moisture-laden condition of the air, combined with extreme stillness, are probably among the most favourable conditions. Under these circumstances, the combustion products arising from the numerous house fires, instead of ascending and dispersing as is generally the case, pour directly downwards as soon as they become sufficiently cooled to acquire the requisite density. Thus a comparatively dry condition of the air, combined with a certain amount of atmospheric agitation, tends to a rapid dispersion of the combustion products, while a still and moisture-laden atmosphere tends to their rapid condensation and descent.

Having pointed out the probable origin of fog, it remains to deal with the best methods for its prevention. It is so obvious as scarcely to need further comment, that the first step in the direction of fog-prevention is to stop, or at least to limit, the amount of smoke and incomplete combustion products escaping into the air. It is, however, not so obvious how this desirable end is to be attained, consistently with economy and general convenience. In the first place, one of two things must be done—either the use of bituminous coal for household purposes must be dispensed with, and we must abolish the cherished and old-fashioned domestic fire, with its cheerful jets of bright hissing flame, and substitute a smokeless fuel in its place; or the construction of the ordinary fireplace must be so modified as to ensure more perfect combustion and the prevention of smoke. Of the two methods, the one adopted will have to depend upon special circumstances and upon individual taste and discretion. No efficient plan has yet been advocated with the requisite publicity, for consuming bituminous coal in an ordinary fireplace so as to produce little or no smoke. In all probability the difficulty might be met by having an arrangement by which the draught could, by means of a damper, be so regulated as to be allowed to act from immediately *above* the fire, as is now the case, or could be shifted so as to act from *underneath* the fire, and thus to draw all smoke and incomplete combustion products through the already incandescent fuel, and so effect their complete combustion. If the use of bituminous coal is to be dispensed with, it will be necessary to consider what substitute could be employed. In the first place, it should be pointed out that ordinary anthracite cannot be used in place of the regular house coal in a common fireplace, as it requires an exceedingly strong draught to effect its combustion. Some of the denser varieties of anthracite possess a further disadvantage in splitting into thousands of small pieces on the first application of heat. It is the more necessary to draw special attention to these details, inasmuch as several gentlemen connected with the anthracite industry are moving in the matter, and in ordinary grates a trial of coal of the description alluded to could only end in disappointment.

Among the descriptions of coal which it is possible to use in ordinary fireplaces where a good draught exists, may be mentioned the best kinds of steam coal obtained from the neighbourhood of Aberdare, Merthyr, Briton Ferry, and Taff Vale. With such coals the poker may be dispensed with, as well as the eventual services of the sweep. Gas coke is also a fuel, the use of which in private houses might be extended with advantage. A prejudice exists against coke, on the grounds of its containing more sulphur than ordinary coal, and of its being more difficult of ignition. The objection of a little extra trouble in lighting a fire may be at once disposed of as scarcely worth consideration. With regard to the question of sulphur, there is no doubt that the products arising from the combustion of ordinary gas coke are unpleasantly sulphurous in their nature, but this is of little consequence provided they are not allowed to escape into the room, and in order to ensure this the only essential is a good draught. The writer has frequently used coke as a fuel, in an ordinary sitting-room where the chimney possessed a good draught, and not the least inconvenience was ever experienced from the combustion products. At the same time it must be admitted that the construction of the majority of domestic fireplaces is such that a difficulty is generally experienced in the use of other than freely-burning fuels, it being difficult to ensure an efficient draught directly through the combustible material. So much, indeed, is this the case, that even in the use of free-burning coals, and with a well-constructed chimney, considerable inconvenience is occasionally experienced. The best of the present fireplaces are more or less erratic in their action, working well perhaps for days, and then suddenly, on the advent of a slight gust of wind, the room is filled with smoke, and the inmates are half suffocated.

If the present arrangement of domestic fireplace is examined, it will be found that the entrance to the chimney, where the so-called regulator is placed, is an orifice of varying dimensions. Below this, at some distance, is the grate, while an open space facing and communicating with the room lies between the grate and the chimney. When an upward draught is caused in the chimney, the partial vacuum formed at its lowermost extremity is supplied by the air of the room, which has a tendency to enter at the point of least resistance. This point of least resistance is undoubtedly the open space between the entrance to the chimney and the grate, so that by far the greater quantity of the air passing up the chimney does not perform useful work by passing through the combustible material in the fireplace, but takes a different channel. As a natural sequence the current requires to be largely in excess of that absolutely necessary to supply the fire with air in order to remove the whole of the combustion products, and should any cause arise to check this current, the immediate effect is the escape of a portion of the smoke into the room, in place of the whole of it passing up the chimney. Not only is this the case, but the comparatively small quantity of air which actually passes through the fuel renders it difficult to satisfactorily consume such combustible materials as require a strong draught. A very slight modification of the existing arrangement would meet the exigencies of the case, and enable such fuel as coke or steam coal to be consumed with perfect facility, at the same time that the inconvenience of a sudden puff of combustion products into the room would be avoided. The modification is this: Let the open space in front of the chimney be partially or wholly closed by a sliding plate of sheet iron, so that the major portion of the air ascending the chimney is compelled to pass actually through the fuel in the grate. The open fire would still be visible, the only alteration being in the space above the fire, and between it and the chimney. The suggestion is not a novel one, being, in fact, the principle adopted in the so-called closed stoves, but it is surprising to find such a simple device not more generally adopted.

Having pointed out the mode by which an ordinary domestic grate could be simply and inexpensively modified so as to adapt it for the consumption of the smokeless and less combustible varieties of fuel, attention may shortly be called to gas stoves. Of these the various descriptions are very numerous, but there is no doubt that, as a substitute for the ordinary coal fire, nothing will find so much favour with the general public as the customary open fireplace provided with gas-jets playing upon some material, which is thereby rendered incandescent, and thus made to resemble an ordinary fire. In this direction the recent suggestion of Dr. Siemens is of great value. That gentleman has pointed out that a greater heat is to be obtained from burning the coke and the gas produced from a certain quantity of coal than can be procured by the direct consumption of the same quantity of coal in the ordinary way. In furtherance of this view he proposes to substitute soft anthracite, or coke, for the asbestos or fire-clay generally used in gas fires, so that the double heat arising from the combustion of the gaseous and solid fuels is obtained simultaneously. Dr. Siemens has given the scheme a

practical trial in a modified form of fireplace, and has found it eminently satisfactory not only as regards heating effect, but in its cheerful and bright appearance, the gas supplying the flame that would be lacking in the combustion of solid fuel alone.

With regard to the general difficulties attending the prevention of fog and smoke, the question is no doubt a national one, but the adoption of any preventive measures will have to be more a matter of enlarged public feeling than a question of legislation. While it seems only reasonable that the Legislature should have firm powers to prevent large manufacturers from pouring forth noxious vapours or thick smoke in large quantities, and contaminating the surrounding atmosphere over a considerable area, it is by no means equally demonstrable that it would be desirable to exercise a similar control over small private establishments. Englishmen are proverbially jealous of their boasted national liberty, even if an extreme freedom of action occasionally interferes with the comfort and welfare of those around them, and most people are, as a rule, content to suffer some inconvenience from others, provided that they themselves can exercise similar privileges of annoyance. It need only be added that the Fog and Smoke Committee deserve all success in their labours, and it is to be hoped that some practical good will, sooner or later, reward the attention which is now being given to the subject.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

THE OXIDATION OF SULPHUR IN COAL GAS.

Sir,—In the leader with which, in your issue of the 14th inst., you honoured my short note on "The Sulphur in Coal Gas," there are a few points on which I must ask you to allow me to comment. I will touch briefly on (1) the chemistry of the subject, (2) the facts connected with it, and (3) the position I myself have taken up. These points, then, *seriatim*.

You say "the sulphur in coal gas is burnt to sulphur dioxide." This, of course, is quite correct. Then you say, "itself a harmless body at ordinary temperatures." This is scarcely a correct description of a gas which will not support life, will not support combustion, and which was so familiar to the noses of users of the old lucifer matches. You are quite correct in your explanation of the action of the Referees Sulphur Test, as worked in the usual way with ammonia or other alkali; but scarcely so when you say that if pure cold water be substituted for the alkaline solution, no sulphuric acid is found. Sulphuric acid *is* found in the water so used, though only a little of it is condensed; the bulk escapes with the other products of combustion. Your precise description of the formation of an individual drop of sulphuric acid on the globe surrounding a gas-jet is also very clear, and I myself have never observed such formation except in a rather cold situation; but the ammonia of the gas has nothing whatever to do with it, and it did not, and does not take a month to form one drop, but a dozen or a score will form in a week. Now, I did not in my paper infer that because drops of sulphuric acid form under certain circumstances on a glass globe, they form on all the objects of a room which is lighted with gas. To form actual "drops," you must, of course, have the presence of moisture, and a somewhat cool surface; but I did state in my paper that the action of sulphuric acid on pictures, books, &c., will take a long time "if the ventilation is *very good*, and the walls of the apartment perfectly free from any *dampness;* and a short time where these two conditions are unfavourable, especially where the walls, or portions of them, are not perfectly dry, the presence of moisture naturally favouring the formation of sulphuric acid, and also absorbing it when formed, and assisting its action."

Your explanation of the non-saturation of the air (in houses and rooms) with moisture, and the indication of this by the wet and dry bulb thermometer, is quite correct and admirably lucid. The heating of the air by the gas does make that air to be farther removed from its saturation point, because hot air will hold more water in solution than cold air; but at the same time the combustion of the hydrogen of the gas causes the air of such rooms to contain a "larger percentage amount" of moisture than before. The consequence of this is not that the bulk of the sulphur "is swept away as sulphur dioxide in the ordinary ventilation of the room," but that the sulphur is present in the room as the vapour of sulphuric acid, the sweeping away depending, of course, on the efficiency of the ventilation. Observers have been occasionally led away by inferring that such a high boiling substance as sulphuric acid would not exist in a state of vapour at the ordinary temperature of about 60° Fahr.; but this is a very elementary notion. They evidently forget that substances give off vapours at temperatures immensely below their boiling points—water, as an example, giving off vapour far below the temperature at which it exists as ice.

The position, then, which I take up is this:—(1) That the whole of the sulphur from an ordinary jet of coal gas, except whilst within a zone of about a foot from the flame, exists as the vapour of sulphuric acid. (2) That sulphur dioxide cannot be proved to exist beyond this distance from the gas-flame. (3) That more or less sulphuric acid is liable to deposit on any object of a room, which is at all hygroscopic, or which at any time may be lower in temperature than the air of the room. (4) That wood, canvas, ordinary woollen and cotton fabrics, paper, leather, &c.—when in good condition—contain about 8 per cent. of hygroscopic moisture natural to them. (5) That all these articles and metals, when placed in the upper part of a room where gas containing much sulphur is burned, are liable to the action of sulphuric acid unless the ventilation is perfect. (6) That perfect ventilation will not confer immunity from this danger in presence of moisture.

If you, Sir, or any of your readers feel inclined to question any part of this opinion, I feel sure I shall be able to adduce sufficient authority to convince you and them.

I have only to add that it would appear, from a so far uncontradicted statement of the Leeds Public Analyst, that whilst I was crediting the Manchester gas, which I burn, with only 10 grains of sulphur per 100 feet, it contains some 46 grains, the Leeds gas (according to the same authority) containing some 22 grains. The difference in the effect of burning 46 grains and 10 grains of sulphur I should be prepared to find is considerably greater than that presented in the mere numerical ratio; and I have a hope that by a wise direction of their energies gas engineers will be able to reduce, sooner or later, the sulphur in gas to a number approaching still nearer to nothing.

Manchester, Dec. 18, 1880. H. Grimshaw, F.C.S.

[With regard to the statements in the above letter, we may remark that the expression "harmless," applied to sulphur dioxide, was only used in reference to the alleged destruction of furniture by the oxidation products of sulphur in coal gas. If the discussion had been on sanitary matters, we might with reason have called sulphur dioxide a "useful disinfectant." Mr. Grimshaw is correct when he says that pure water, used in the Referees Sulphur Test (without ammonia), will retain some of the sulphur as sulphuric acid. We did not deny this fact. What we did state was that "when the products of combustion . . . . are drawn through an excess of pure cold water, no sulphuric acid is found." This statement requires, perhaps, some explanation. The water must be in large quantity (to keep cool), and must contain no dissolved oxygen. Now, since freshly-boiled water will gradually dissolve oxygen when the products of combustion of a gas-flame, mixed with excess of air, are caused to bubble through it, it is necessary to keep the water charged with some neutral gas, such as carbonic acid, to prevent the slight solution of oxygen which, *in the liquid state*, oxidizes the sulphurous to sulphuric acid. From Mr. Grimshaw's description, we imagine his gas-jet and shade must be subjected to a succession of very cold draughts, sufficient to cool down the shade below its "dew point" several times in the course of each evening. Under such circumstances it is, of course, possible that the phenomena we described as ordinarily occurring once each evening, at the lighting of the gas, take place on each successive chill. We need only remark that gas shades in rooms are not generally under such conditions. With regard to the "vapour of sulphuric acid," we believe Mr. Grimshaw to be distinctly wrong. So far from considering sulphuric acid to be present as a vapour in the atmosphere of a gas-lighted room, we doubt whether a molecule of sulphuric acid (H_2SO_4) *ever* exists in the state of vapour for more than an infinitesimally small interval of time. When pure sulphuric acid is gradually warmed, it begins to fume about 30° C., giving off *sulphur trioxide* (SO_3), showing that at this temperature the compound suffers some decomposition. From its vapour density there can be no doubt that at 440° C. sulphuric acid does not exist as a vapour, but is *completely* decomposed into steam and sulphur trioxide. It is possible to distil sulphuric acid, because the molecules of steam and sulphur trioxide, dissociated and volatilized by the heat, re-combine, on cooling, to form a liquid molecule of sulphuric acid in the condenser. It is, indeed, conceivable that some sulphuric acid should exist in the atmosphere of a gas-lighted room, suspended as a *cloud* of small liquid particles, formed by the direct union of *gaseous* sulphur dioxide, steam, and oxygen. But there is no evidence that such direct union of the *gases* takes place. When a bottle of sulphurous acid is opened, and the sulphur dioxide allowed to escape into the moist air of a room, no visible cloud is produced, as is the case with hydrochloric acid gas, which, owing to its affinity for water, condenses the aqueous vapour and forms a cloud of minute drops of aqueous hydrochloric acid. The absence of the visible cloud seems to show that steam and sulphur dioxide do not combine to form liquid particles of sulphurous acid. Again, dry oxygen and dry sulphur dioxide do not unite at ordinary temperatures, and, therefore, we have no reason for presuming *à priori* that the three bodies would unite when mixed together *in the gaseous state* at the ordinary temperature. The fact admitted by Mr. Grimshaw, that, when pure water is used in the Referees apparatus, only a small portion of the sulphur is found as sulphuric acid in the water, seems to us strong evidence against the theory that all the sulphur from a gas-jet "except whilst within a zone of about a foot from the flame" gets oxidized to sulphuric acid. The sulphur could not pass through the condenser either as a *cloud* of sulphuric acid or as sulphur trioxide *vapour*. We heartily concur in Mr. Grimshaw's hope that gas engineers will so improve their methods of purification that the "sulphur question" will very soon become a forgotten controversy.—Ed. J. G. L.]

Legal Intelligence.

LIVERPOOL CITY SESSIONS.—Saturday, Dec. 18.

(*Before Mr.* J. B. Aspinall, Q.C., *Recorder.*)

THE APPLICATION TO REDUCE THE CITY WATER-RATE.

At the last sessions an application was made by Mr. Segar (see *ante*, p. 852), on behalf of Mr. John Murphy, Secretary to the Liverpool Land and House Owners Association, under the Liverpool Water-Works Act, 1847, to have a reduction made in the rates and charges for water supplied in the city. On that occasion Mr. Segar maintained that the Corporation had accumulated something like £200,000 over and above the requirements of the water-rates, which sum they lent to themselves and paid interest for, although the only powers they had for raising money were, first, to pay off the debt upon mortgages; secondly, for the purpose of supplying water; thirdly, for the purpose of keeping the supply going by the necessary repairs. On these grounds he asked the Recorder to reduce the rate after inquiry, which he was authorized to make, into the water accounts. To this Mr. M'Connell, who appeared for the Corporation, replied that the Court had no jurisdiction, the machinery provided by the Act relied upon by Mr. Segar having been repealed by a subsequent Act—the Liverpool Corporation Water-Works Act, 1862. The Recorder reserved his decision, until the present sessions, and to-day the case again came before the Court, the same Counsel appearing for the parties.

The Recorder, in giving judgment, referred at considerable length to the various Acts of Parliament which were material to the issue, and said if the Act of 1847 had stood alone there would have been no doubt as to his jurisdiction. But there were several subsequent Acts which placed the Corporation under different obligations, and made separate and distinct provision for meeting them, without any reference whatever to the provisions of the Act of 1847 for the exercise of the powers of Courts of Quarter Sessions, and the result would have been that it would have been almost, if not absolutely impossible at this stage of the water accounts to

have exercised the power conferred by the Act of 1847. There appeared to be some important matters with reference to this question in some of the other Acts as well as the two referred to. When, however, he came to the Act of 1862, there was a special enactment, upon which Mr. M'Connell relied, that the action of the Council should be final and conclusive upon all points concerned. He was therefore bound to rule that, if not in set terms, at least by necessary implication, the provisions of the Act of 1847 had been repealed. In coming to this conclusion, he was extremely glad that it could do very little harm to anybody, because, as he refused to exercise jurisdiction, a *mandamus* would lie, and the applicants could have no difficulty in setting him right if he was wrong. He thought it was perhaps fortunate that he was able to deal with the question in this way, because it afforded the cheapest and easiest mode of setting it right. He must refuse to hear the application any further.

BURNLEY BOROUGH POLICE COURT.—Wednesday, Dec. 22.

(*Before Messrs.* R. Handsley *and* G. Haslam.)

RAWLINSON *v.* CORPORATION OF BURNLEY.

In this case proceedings were instituted by John Rawlinson, now a machine broker, but formerly a mill manager, cotton spinner, and manufacturer, the ground of complaint being that the Corporation had illegally discontinued his supply of gas.

Mr. Knowles appeared for the complainant; the Town Clerk (Mr. A. B. Creeke) defended.

Mr. Knowles said these proceedings were taken under section 198 of the Burnley Borough Improvement Act, which stated that any person having a supply of gas should give proper security for the payment of the estimated rent for three months, and the Corporation should be liable to a penalty not exceeding £5 if they discontinued the supply of gas unless the consumer failed to give them security. For some time previous to the month of August, Mr. Rawlinson did not have a house at Burnley, but in that month he became tenant of the house No. 8, Canning Street, and made use of the gas-meter in it up to the 26th of October, when a servant of the Corporation, named Crabtree, called and plugged the gas-tap with tallow. Shortly afterwards the Corporation served Mr. Rawlinson with a demand note for the gas that had been supplied; and this demand note Mr. Rawlinson discharged on the 24th of November. There had been no demand for security as the section provided, hence he (Mr. Knowles) submitted that the Corporation were wrong in acting as they had done.

The Town Clerk took a preliminary objection to the case proceeding. He said the jurisdiction of the Magistrates only arose in the event of the Corporation discontinuing to supply gas, or refusing to supply "for want of security." They had not asked for any security, and therefore the case contemplated by the section which had been quoted did not arise. At the end of the section were these words: "And the Corporation shall be liable to a penalty not exceeding £5 if they shall discontinue to supply to any person not having a supply *for want of such security*." Now no such security had been demanded, and the Corporation had not asked for it.

Abraham Crabtree, one of the meter inspectors in the employ of the Corporation, was then called on behalf of the plaintiff. He said it was part of his duty to go round and take the state of the meters. On Oct. 26 he called at No. 8, Canning Street, and, after ascertaining what quantity of gas had been consumed, he stopped the gas from entering the meter.

Mr. Handsley (interposing, and addressing the Town Clerk) said: I do not know, after this evidence, and seeing that there was no security asked for, how you can defend the case.

The Town Clerk: But the Magistrates have no jurisdiction in the matter.

Mr. Handsley said he did not agree with the Town Clerk on this point, as the case seemed perfectly clear to him. The Corporation were liable to a penalty if they discontinued the supply of gas "for want of such security." They had never asked for security, so that this part of the section did not apply at all.

The Town Clerk: The meaning I attach to the clause is this: That if we had refused to supply gas for want of security, then we should have been liable to a penalty unless we could prove that we had demanded the security and it had not been given for seven days.

Witness (continuing) said the book in which he entered the consumption of gas that had taken place was kept purposely for removals, although it also contained the names of those who had not removed, if they had not paid all the arrears they owed. He did not ask the complainant for any security, as that did not lie in his power.

The Town Clerk: Did you know before you went to the house that the defendant was living there?

Witness: Yes.

How long before did you hear?—I took the state of the meter at a house kept in complainant's wife's maiden name, I believe (Agnes Tasker), at No. 39, Forest Street.

Mr. Nowell (Magistrates Clerk): Was the gas rent in arrear there?

Witness: Not that I am aware of. Proceeding, witness said he could not tell when he took the state of the meter at No. 39, Forest Street, but one of the other meter inspectors finding that John Rawlinson was using gas, witness was directed to go and cut off the supply.

Mr. Knowles intimated that he should be able to prove that Agnes Tasker was not the complainant's wife.

Mr. Handsley: It is just as well to show that, because the inference here is just what the Corporation wish to draw from it. But how the Corporation are prejudiced when the gas has all been paid for at No. 39, Forest Street, I fail to see.

Witness further stated, in reply to the Town Clerk, that Rawlinson had entered into no obligation to take gas from the Corporation.

The Town Clerk: Then up to that time the complainant had been using Corporation gas without giving them any intimation that he was doing so.

Mr. Nowell (to witness): What month was this entered into the Corporation books?

Witness: I am not prepared to say; and I do not know by whom.

Mr. Handsley: Thus you see you have no clear evidence on this point, for you have nothing to say about it.

The Town Clerk: This is not my witness. I did not know he was here. He has been brought here by the complainant.

Mr. Handsley: The Act of Parliament says you shall simply ask a consumer for security, and if he fails to give it you shall refuse to supply him with gas. But the gas-works are erected for the benefit of the whole of the inhabitants.

The Town Clerk: Yes, but do you see section 256, sub-section 1?

Mr. Handsley (reading): If any person who is supplied with gas or water fails to pay any gas or water rent due from him, or give, when demanded, such security, the Corporation may, notwithstanding any existing contract, cut off the supply." Very well. But here the man has paid, or if he has not paid in full he has been released by law, which is the same thing.

The Town Clerk: That is so, so far as any legal liability to recover is concerned.

Mr. Handsley: You are only entitled to cut off the gas in case there is a debt legally due to you which a consumer is bound to pay. But this is not legally due, as he has gone through the County Court and got his discharge.

The Town Clerk: We cut the gas off when the account was not paid before the bankruptcy, and this was the first time we had any knowledge that complainant had again been using gas.

Some argument here took place whether the phrase "may supply" should be taken as meaning "shall supply," the Town Clerk reading several sections to show that it should read "may," inasmuch as the word "shall" was employed in cases where the imperative mood was used.

Mr. Handsley: But how does that question arise in this case? Here is the fact that they do not supply gas.

The Town Clerk: But I will prove that complainant took it without our knowledge, and that when it came to our knowledge we cut the supply off, and sent him in a bill for what he had consumed.

Mr. Nowell pointed out that though the 187th section said that the Corporation "may supply gas," yet when it was considered in connection with the larger section just read, it was evidently the intention of the Legislature to look upon it in the compulsory sense; so that when he came to read the two sections together he arrived at the conclusion that the first "may" meant "shall."

The Town Clerk: There is a great distinction in the section relating to water, for it says the Corporation "shall" supply it for domestic purposes, but that they "may" do so for manufacturing purposes.

Complainant was then called, and said he removed from No. 39, Forest Street to 8, Canning Street on the 23rd of August last. His aunt, Agnes Tasker, was the tenant of 39, Forest Street, and witness purchased the furniture from her a few days before he removed to Canning Street. Whilst removing, he told a man named Thomas Howarth, who was assisting him, to go and ask the men to come and take the state of the meter. At the time he paid the demand note on Nov. 24, he saw Mr. King, the Borough Accountant, in his private office, and asked him why the gas supply had been discontinued. Mr. King replied, "Because the old accounts were not paid belonging to Mount Pleasant Mill and the house in Nelson Square." This was due prior to the filing of his petition, which was done on the 27th of November, 1878, previously to which he had been a mill manager, and had contemplated carrying on the business of a cotton spinner and manufacturer. At the time his gas was cut off in Nelson Square he met Mr. King in Manchester Road, and asked him on what conditions he could be supplied with gas. Mr. King replied, "You cannot have any gas from the Corporation until you have paid for what you have consumed;" and added that he had direct instructions from the Gas Committee not to give a fresh supply of gas to any one who was in arrear. On the 24th of November last, when witness went to ask about the discontinuance of the supply of his gas, he took with him his old deposit note, and told Mr. King that he considered he had forfeited it under his liquidation arrangement, and he also said that he was prepared to pay a further deposit of 5s. or 10s., or any other reasonable sum. Mr. King replied that he could not give him a further supply of gas until the two old accounts, which originally amounted to £4 7s. 2d., but the balance of which was £3 18s. 3d., were paid.

Cross-examined by the Town Clerk, witness said he offered to pay 8s. in the pound, but his creditors would not accept it, and the trustee only paid 1s. in the pound. When he removed, he did not send any intimation to the Corporation that he wished to be supplied with gas. He simply said he was leaving Forest Street and removing to No. 8, Canning Street.

Mr. Handsley: I think you must take that as being equivalent to an indirect intimation that he intended to use gas.

The Town Clerk: We simply ascertained on Oct. 26 that he was there and consuming gas, and we made out the bill from the state of the meter when the previous tenant left, to the state in which the inspector then found it.

Mr. Handsley (to the Town Clerk): I think Mr. Knowles has at any rate established a case that you must answer. It is a most important case.

Mr. Nowell: Yes; we have never had a similar one in this Court.

The Town Clerk then addressed the Bench, and said the Gas Committee, as they assumed, had power which enabled them to refuse the supply of gas to any one who failed to pay. In this instance there were arrears amounting to nearly £4. It was true that the complainant had filed his petition and obtained his discharge, but nevertheless the above-named amount was still due to the Corporation, and it was a penalty imposed upon a defaulter for not discharging his accounts—that he could not have the privileges possessed by other burgesses so long as he was a defaulter, although, because of his having taken proceedings in liquidation, the Corporation were not able to recover the amount.

Mr. Knowles: I think there is a statute giving credit.

The Town Clerk: Yes, I know there is; but under this particular section, with all due deference, I submit that the Magistrates have no jurisdiction upon the facts put before them. The section, stripped of unnecessary words, reads: "The Corporation shall be liable to a penalty, not exceeding £5, if it shall discontinue the supply of gas to any person then having a supply, for want of security, unless such person has failed to give us security within seven days, which we could ask for." I do not say in this case that we have asked, but we might have done so. If persons come and request to be supplied with gas, and we say, "Very well, we will supply you, but you must give security," that makes a contract, and if they cannot agree as to the terms of the security, the Magistrates are called in as arbitrators to say what security shall be given.

Mr. Nowell: But supposing a person applied to you for gas, and that you had some reason or other for declining to supply him, and refrained from asking for some security, do you say that under the section you would not be liable?

The Town Clerk: No, not before the Justices. It would be a question then for a civil action. The only jurisdiction of the Magistrates is to arbitrate and say whether the amount of security is reasonable or not.

Mr. Handsley: I am quite clear there is nothing due to the Corporation, and that nothing can justify the Corporation in treating people in this way.

Mr. Haslam said the question presented itself to his mind in this way: Had the Corporation any advantage over other creditors?

The Town Clerk: They have no advantage in recovering money. But supposing you had a man down in your books as owing you a certain amount, you are not bound to supply him again.

Mr. Haslam: No, certainly not.

The Town Clerk: Well, it is just the same here. If a man gets a debt on our books, the Act of Parliament gives us power to refuse to supply him further until he pays our account in full.

Mr. Knowles: You are not trustees for the public benefit.

The Town Clerk: Yes, we are.

The Magistrates then held a consultation, at the close of which

Mr. Handsley said: This question is both a difficult and important one, and Mr. Haslam and I will take a week to consider our decision; and in the meantime Mr. Nowell will consider the question, and look up cases.

Miscellaneous News.

A REVIEW OF THE MANUFACTURING OPERATIONS OF THE PARIS GAS COMPANY IN 1870 AND 1880.

The following is the report of the Commission nominated by the French Minister of the Interior, early in the present year, under the circumstances and with the objects referred to in the article on "The Gas Supply of Paris," which appeared in the last number of the JOURNAL:—

In the present report the Commission purpose following, step by step, the processes employed by the Paris Gas Company in the manufacture of illuminating gas, from the delivery of the coal into the Company's premises, down to the passage of the manufactured gas through the outlet-valves into the mains for distribution. In doing so, it will be convenient to divide the entire process into five stages, viz.: (1) the distillation of the coal; (2) the condensation of the tar products; (3) the chemical purification of the gas; (4) its storeage; and (5) the treatment of the residual products —coke, tar, and ammoniacal liquor.

I. *Distillation of the Coal.*

Of the several operations comprised in the manufacture of gas, the distillation of the coal is assuredly the most important, as it is upon the results obtained by distillation that the principal return depends. This work the Paris Gas Company have succeeded in making more profitable than it formerly was, and the improvements they have effected therein have had an important influence on the quantity of gas obtained from the coal put into the retorts. In order to ascertain exactly the extent of this influence, the Commission applied to the Managing Director of the Company to be furnished with the official returns showing the quantity of gas produced during the past 15 years from each hundredweight of coal carbonized, and the following figures were supplied:—

Year.	Gas Made. Per 100 Kilos. of Coal. Cub. Mètres.	Per Ton of Coal. Cubic Feet.
1865	28·56 =	10,082
1866	29·05 =	10,255
1869	29·34 =	10,357
1870	29·53 =	10,424
1871	28·87 =	10,190
1872	28·83 =	10,177
1873	28·77 =	10,156
1874	28·10 =	9,920
1875	29·10 =	10,272
1876	29·13 =	10,283
1877	29·98 =	10,583
1878	29·99 =	10,586
1879	30·20 =	10.661

These figures show that the yield of gas, which before the year 1861 rarely exceeded 27 or 28 cubic mètres per 100 kilos. of coal (about 8500 to 9800 cubic feet per ton) has gradually increased to 30·20 cubic mètres (about 10,600 cubic feet per ton). This shows an increased yield of very nearly 2 cubic mètres, or about 7 per cent., per 100 kilos. of coal carbonized. Here is evidently an important fact; but it should be remarked, on the one hand, that it was long before the year 1870 that this improvement began to show itself; on the other hand, that it is simply to skilful manipulation, and not to the introduction of any processes foreign to the system of manufacture employed in 1870, that this increased yield of gas is to be attributed. In fact, several causes have combined to bring about this result. The retorts have been manufactured with greater care; double and treble cylinder combined exhausters, working regularly and at trifling expense, have not since 1870 merely, but for more than 20 years past, gradually replaced those by Pauwels; more carefully selected coals, obtained from Belgium, the north of France, and elsewhere, have been used together, and from this admixture of raw material has resulted a more regular and more abundant production of gas than that hitherto yielded by single varieties of coal, or even by mixtures thereof less carefully made. However, the influence of these causes has really been only a secondary one; it is in the exact determination of the temperature most favourable for the distillation of coal, and in obtaining the utmost duty from the retorts after they have been brought up to this temperature, that must be sought the chief cause of the improved yield of gas to which allusion has just been made.

When, some 15 or 18 years ago, gas makers began to substitute, for the comparatively low temperatures previously employed in distillation, the temperature of about 1200° C. (2200° Fahr.), by which a considerably larger yield of gas is effected, it was at once found to be necessary to draw off as quickly as possible the gas produced at this high temperature, and in order to do so the method adopted was to allow in the retort only the space actually required for the expansion of the coke. It was thus that the Company were gradually led to increase the charge of each retort, which formerly rarely exceeded 60 kilos. (132 lbs.), to 78 kilos. (172 lbs.) in 1861, to 90 kilos. (198 lbs.) in 1863, to 108 kilos. (238 lbs.) in 1866, and to 127 kilos. (280 lbs.) in 1869, and then to keep it at the almost stationary figure at which it now stands—viz., 130 kilos. (286 lbs.). It is in this way that the Company have succeeded in obtaining their high yields of gas, which since 1870 have risen to 29·53 cubic mètres per 100 kilos. of coal carbonized (about 10,425 cubic feet per ton), and have only fluctuated to a very slight degree above or below this figure, such fluctuations being in all cases attributable to variations in the character of the coal employed.

In none of the foregoing details of carbonization is it possible to recognize any process foreign to the system of manufacture previously employed by the Company. It is simply to more skilful manipulation, and not to the employment of any arrangements answering to the definition of new processes, that is to be attributed the increased yield of gas which the Commission found had been obtained. But even if this were otherwise, the period at which these improved methods of carboniztion were adopted —viz., 1862–64—would at once and entirely exclude them from consideration in the present case.

However, this more skilful manipulation does not alone represent all the improvement of which the method pursued in the distillation of coal is actually susceptible, and it is desirable also to examine to what extent the improved results shown have been influenced by the employment by the Company, at several of their stations, of the Siemens regenerator furnaces. The adoption of these furnaces in certain industrial operations where great heat is required, has resulted in a saving of from 40 to 50 per cent. in the cost of fuel. Has this been the case with gas manufacture? Here is a point the consideration of which is of so much more importance, inasmuch as the adoption of these furnaces, whether it took place after 1870, or whether it were at the present time imposed upon the Company, might most assuredly be regarded as the introduction of a process such as Article 48 of the Company's concession has been understood to provide for. But, on the one hand, the economy of combustible which the use of the Siemens furnaces in glass-making, metallurgy, and similar operations, makes possible of realization, is very considerably reduced in the face of the lower temperature suitable for the manufacture of gas, and is moreover largely counterbalanced by the increased expense of first establishment necessitated by their employment; on the other hand, it was at a period considerably anterior to 1870—namely, in 1863—that the Company constructed at their Vaugirard station, the first four Siemens furnaces set up in France for the manufacture of gas. These two points are clearly established in a report presented to the Board of Direction of the Company on the 26th of January, 1867, by the present Managing Director, M. Camus. An authentic copy of this report has been submitted to the Commission, and it shows that the economy in fuel realized by the employment of the Siemens regenerator furnaces in the manufacture of illuminating gas, far from reaching, as in the case of certain industries in which very high heats are required, 40 or 50 per cent., never exceeds 20, and frequently falls to 17 or 18 per cent.; also that the economy of fuel thus realized is less than the interest, at 6 per cent., on the increased expense necessitated by the special mode of constructing the retort-houses and building the ovens to which the regenerative system of heating could be usefully applied, and notably the double-stage houses. In fact, on the one hand, the economy of fuel due to the employment of the Siemens furnaces is represented by a sum of only 76 frs. 50 c. (£3 1s. 3d.) per retort per annum, while the cost of setting, which for an ordinary retort-house represents a sum of 1263 frs. 72 c. (£50 11s.), a double-stage house with the Siemens furnaces is increased to 2605 frs. 70 c. (£104 5s.); whence arises, to the disadvantage of retort-settings of this kind, a difference in the first cost of not less than 1341 frs. 98 c. (£53 14s.), the interest on which at 6 per cent. would come to 80 frs. 51 c. (£3 4s. 6d.)—a greater amount than that realized by the economy effected in fuel. It has also been observed that since the time when the Siemens furnaces were tried for the first time by the Company—viz., in 1863—their employment has been limited to certain special cases. Of the original stations of the Company, two only, those at St. Mandé and Vaugirard, are provided with these furnaces, in the one case to the extent of half, in the other to the extent of one-third of the entire number of settings; while among the new or more recently constructed works, in those at Ivry and at Clichy only—the latter not having yet been brought into operation—has the regenerative system been adopted. It was owing to the exceptional position of each of the above stations, as well as to the necessity of guarding against certain special inconveniences, that the Company were led to adopt the Siemens furnaces. At Vaugirard and at St. Mandé the construction of double-tier ovens, the cooling by the outer air of the lower portion of these ovens, and the largely increased outlay for combustible necessitated by such cooling, compelled the Company to seek, by the employment of the regenerative system, some compensation for the disadvantageous conditions under which they were working. At Ivry and at Clichy, the necessity of excavating the soil beneath the retort-benches, for the purpose of solidifying it, induced the Company to substitute regenerator furnaces for massive foundations, as the former, by the economy of fuel they would effect, would compensate for the extra expense rendered necessary by the nature of the ground.

Beyond, however, the special cases above reported, the Company have been careful of generally applying the Siemens furnaces to their retort-settings, and in the large works at La Villette, as well as in those at Passy, Les Ternes, St. Denis, Boulogne, and other places, they continue to heat the retorts by the ordinary methods. In the partial employment by the Company of these furnaces the Commission fail to discern one of the processes contemplated by the 48th article of the concession. This may be considered as a system foreign to the original process of gas-making; but, on the one hand, its adoption took place anterior to the year 1870, it being in 1863 that the Company for the first time commenced working the regenerative system in their works at Vaugirard; and, on the other, its employment is not calculated to effect any very notable diminution in the net cost of gas.

II. *Condensation.*

The processes adopted by the Company for the condensation of those residual products of gas manufacture which are liquefiable by simple cooling, and particularly the tars, have not undergone any very important change. It is still by causing the gas, on leaving the exhausters, to pass through a long series of pipes, sometimes horizontal, and sometimes, and preferably, vertical, that the condensation of the greater part of the tarry matters and a certain portion of the ammoniacal liquor is effected.

To this mode of proceeding, however, was added, in 1874, an improvement of such originality that it cannot possibly be considered as forming part of the system of manufacture followed in 1870, but, on the contrary, must be regarded as a new process. The improvement referred to is that effected by MM. Pelouze and Audouin by means of their condenser. On leaving the series of pipes through which the gas had passed in the process of cooling, it was still found to carry with it, notwithstanding the refrigeration to which it had been subjected, a certain proportion of tarry matters, and notably the light hydrocarbons, which in due course came into contact with the purifying materials, clogging them up, and thus rendering their action less efficacious; besides this, on these impurities becoming mixed up with the purifying materials they could not be extracted, and this resulted in a loss to the Company. In order to effect the separation of these tarry matters, MM. Pelouze and Audouin conceived the very ingenious notion of compelling the gas, after it left the pipe condensers, to pass through a suspended vessel, the sides of which, formed of two concentric plates of iron, are separated from each other by a distance of 5 or 6 millimètres (0·20 or 0·24 inch). The inner of these plates is pierced with a number of holes 1·5 millimètre (0·6 inch) in diameter, through which the gas passes, and being impelled forward by its own velocity, strikes the second plate, which presents a plain surface opposite each hole in the first plate. Under this system of attenuation first and shock afterwards, the tarry matters suspended in the gas in the form of thick smoke unite to form a liquid, which trickles down the sides of the vessel, and flows into the bottom of the condenser.

Adopted by the Company, and now installed in nearly all their works, the condenser of MM. Pelouze and Audouin enables them to obtain a very much larger quantity of tar than they had previously done, as well as to effect an easier and more complete purification of the gas. It is therefore right to inquire what influence, if any, the adoption of this appliance has had upon the cost price of gas, and whether any notable reduction has been effected. The employment by the Company of the Pelouze and Audouin condenser has, in reality, had but very slight effect on their general working expenses, and the saving effected thereby has been quite insignificant. In fact, from some particulars furnished by the Company to the Commission, it appears that the annual benefit derived from the employment of this condenser in all the Company's works would, everything included, amount to about 51,000 frs. (£2040). This amount, spread over a production of 220 million cubic mètres (7766 million cubic feet) of gas, represents only 0·023 c. per cubic mètre (or about 0·06d. per 1000 cubic feet). The reduction of the cost price of gas resulting from the adoption of this condenser since 1870 cannot, under any circumstances, be regarded as of very great importance.

III. *Purification.*

The methods employed by the Company for the chemical purification of their gas—that is to say, for the elimination of the sulphuretted hydrogen and the volatile ammoniacal salts it contains—are at the present

time exactly the same as they were of old. The process is still that of compelling the gas to pass through layers of sawdust, of varying degrees of thickness, saturated with sulphate of lime and oxide of iron.

Certain improvements in detail have been effected in the purifying operations, such as placing in front of each of the sets of purifiers an extra vessel containing only moistened sawdust, intended to extract a considerable portion of the ammoniacal salts, and thereby enabling the purifying material in the succeeding vessels to act more efficaciously. These improvements in detail have not, however, been considered by the Commission to be of sufficient importance to merit special attention. Not only do they not constitute processes foreign to the system of manufacture formerly employed by the Company, but cannot, strictly speaking, be called processes at all. Furthermore, their effect on the net cost of the gas is absolutely *nil*.

IV. *Storeage.*

The construction of gasholders, whether single-lift or telescopic, has not of late years been aided by any new systems. It is only in dimensions, which the Company have in one case increased to 30,000 cubic mètres (1,060,000 cubic feet), that the present holders differ from those constructed prior to the year 1870. The general employment of Pauwels's articulated inlet and outlet pipes, and the adoption of tangential guide-rollers, which ensure more regularity in the rise and fall of the holder, are facts now so long established that they assuredly cannot be considered as the results of processes foreign to the system of manufacture followed by the Company in 1870, and are in no case of such a nature as to exercise any influence in the way of reducing, to any appreciable degree, the net cost of the gas.

V. *Treatment of Residuals.*

Of the several branches of the gas industry carried on by the Company, the one which most arrested the attention of the Commission was that which has for its object the treatment of the residual products. Of these products there are three—viz., coke, tar, and ammoniacal liquor. The treatment of two of these residuals—the coke and the tar—has of late years been subjected to some very important modifications by the Company; but no change has been effected in the treatment of their ammoniacal liquor. From the fact of these improvements having been applied to the treatment of the coke and tar, important benefits have been realized; and though these benefits have been considerably exaggerated, they are such that the Commission considered they ought to inquire whether their realization was due to causes of the nature of those contemplated by Article 48 of the concession.

Deducting the increased financial burdens the Company have been subjected to during the period under consideration, the profit derived from the treatment of the coke and tar may be considered as representing at the present time nearly 0·5 c. per cubic mètre (about 1·4d. per 1000 cubic feet) of gas made. This is shown by figures giving the comparative sales of residual products during the past ten years; the figures also show that the value of these products, which in 1869 amounted to 7·47 c. per cubic mètre (about 1s. 8d. per 1000 cubic feet) of gas, increased progressively to 10·47 c., the maximum price to which it attained in 1875, and from this time it gradually dropped to 7·86 c. per cubic mètre (1s. 10d. per 1000 cubic feet). It is to the improvements introduced by the Company in the processes employed for the utilization of their coke and tar that the profit shown by these figures is attributable.

Recognizing these improvements, it became a question for the Commission to consider whether, although they were the outcome of the adoption of new processes foreign to the system of manufacture pursued anterior to 1870, they ought to be considered as falling within the scope of Article 48 of the Company's concession. The Commission are of opinion that they ought not. They consider that the treatment of residual products forms no part of gas manufacture, properly speaking; that it is simply an industry closely connected with the production of gas; and that if, by the terms of their concession, the Company are obliged to divide with the City the profits resulting from this subsidiary branch of their operations, they are equally bound to do so in the case of any processes to which they consider they ought to have recourse.

A few reflections will suffice to prove that this could not possibly be otherwise. On the one hand the coke, on the other the several products resulting from the treatment of the tars, are articles of commerce which have a variable market value. They are subject to the law of supply and demand, while the principal product of the Company's operations—viz., illuminating gas—is always offered to consumers at the unvarying price assigned to it in the concession. Therefore if it were pretended that whenever the selling price of these residual products ruled high, there should, as a consequence of the extra profit made, be a reduction in the price of gas, strict equity would render inevitable a corresponding increase in price whenever these products happened to lose the special value which had make them a source of profit.

Without discussing this question at any length, one consideration will alone be sufficient to establish the fact that the treatment of the residual products of gas manufacture cannot be classed among the operations specially referred to by Article 48 of the concession. It is this: There is nothing to compel the Company to work up their residuals themselves, and instead of treating them upon their own works, they are at liberty to dispose of them in a crude state to manufacturers altogether outside their own body. In this case, without having to trouble themselves about the terms of Article 48, they would be able to profit by the increased value which might have been ensured to these products by a more or less active demand for them. The supposition of a similar condition of things to those here indicated is in no way gratuitous, and in England especially, the whole of the gas companies, with some few exceptions, pursue this course with regard to their residuals.

In dwelling upon these considerations, the Commission have been led to think that the treatment of residuals constitutes, in the works of the Paris Gas Company, a branch of industry perfectly independent of the principal one, and that consequently Article 48 of the concession cannot be regarded as applicable to the processes employed in carrying it on.

The Commission had, however, to take into consideration the possibility of their opinion on this part of the question not being accepted, and to ascertain whether, in the operations connected with the treatment of residuals, any new processes were to be met with, and whether the adoption of these processes was capable of effecting any definite reduction in the net cost of gas. And in doing this the Commission had not to occupy themselves with the subject of the treatment of the ammoniacal liquor, and the manufacture of the chemical products resulting therefrom, as into this branch of the Company's operations no modification had been imported. The treatment of coke, however, could not fail to arrest their attention. In fact, by improving the coke breakers and screening appliances in use from the commencement of their labours, the Company have, in the first place, been enabled to give to this combustible, which in former times was principally sold abroad, a character and appearance such as to cause Parisians to seek it eagerly. When the Company found themselves encumbered with large quantities of breeze, caused by the breaking of the coke, it occurred to them to compress it with the pitch remaining after the distillation of the tar, in such a way as to obtain thereby a combustible material which could be employed in heating the retorts. Examined with care, these modifications did not appear to the Commission to merit, on any single point, the appellation of new processes; and even had it been otherwise, they could not in any case be considered as having contributed to a reduction in the cost price of gas. From some official figures communicated to the Commission, they find that the produce of the sale of coke, which in 1869 represented 6·2 c. per cubic mètre (1s. 6d. per 1000 cubic feet) of gas made, represents at present only 5·9 c. per cubic mètre (1s. 4½d. per 1000 cubic feet). In short, the modifications in the treatment of coke to which reference has just been made have resulted, not in the reduction of the cost price of gas, but in preventing the price from rising on account of the difficulties experienced in disposing of the coke in its crude state.

The treatment of the tar has produced different results, and to make their importance appreciated it will be sufficient to remark that in 1869 the sale of the various products obtained from tar represented 0·78 c. per cubic mètre (2·2d. per 1000 cubic feet) of gas made, while in 1879 it represented 1·18 c. per cubic mètre (3·3d. per 1000 cubic feet); whence there results a difference of 0·4 c. per cubic mètre (1·1d. per 1000 cubic feet) in favour of the present position. It is in the extraction of anthracene and in the daily increasing employment of the heavy oils for creosoting timber, that the cause of this enhanced value must be sought. It is not, therefore, to be attributed to the employment of any new manufacturing processes. The presence of anthracene in coal tar was well known, but this hydrocarburet not being employed, it was abandoned among the residual products. A scientific discovery was made which revealed in the anthracene the starting-point of one of the most remarkable transformations that has been realized by modern chemistry—a transformation which from the anthracene produced the raw material for the manufacture of artificial alizarine; and the intelligent manufacturer immediately set about obtaining from the residual products of the distillation of coal, the hydrocarburet which had suddenly acquired an unexpected value. But in order to obtain it he has not been compelled to employ any really new process; he has simply had to fractionate in a somewhat different way, and at increased expense, the products derived from the distillation of the tar.

The anthracene which the Paris Gas Company extract from their tar possesses, in truth, a considerable value; but this value is extremely variable, and the price has been known to rise to 11 frs. 86 c. (9s. 6d.), in 1875, and fall to 4 frs. 76 c. (3s. 10d.) in 1878, then rise again, in 1879, to 7 frs. 6 c. (5s. 8d.). These variations in price are such that it would be impossible, as has already been pointed out, to base upon the sale of this product a reduction in the price of gas, even though, contrary to the opinion of the Commission, the treatment of residual products had been specially contemplated by Article 48 of the concession.

Conclusions.

It follows, from the foregoing observations, that if the system of gas manufacture followed by the Paris Gas Company in 1870 is contrasted with that employed by them in 1880, the following conclusions will be arrived at:—

1. That with regard to the distillation of coal the Company have effected some important improvements, but that such improvements are due to more skilful manipulation, and not to any manufacturing process foreign to those in use in 1870.
2. That in consequence of the adoption of the Pelouze and Audouin condenser the Company have effected, by a new process, an improvement corresponding to a reduction of 0·023 c. per cubic mètre of gas made—a reduction which cannot be considered as of very great importance.
3. That the purification and storeage of gas is carried on in the same way as hitherto.
4. That the treatment of the residual products cannot be considered as forming part of the operations understood to be contemplated by Article 48 of the Company's concession; that the operations comprised in such treatment are not, strictly speaking, connected with gas manufacture as understood by the terms of that concession, but form altogether a separate branch of manufacture. Hence, regarded in the light of the terms of Article 48, there is no ground for taking into account any improvements that have been effected in this direction, inasmuch as such improvements do not result from the adoption of new processes.

While, therefore, the Commission fully recognize the desirability of effecting a considerable reduction in the price of the gas supplied to the inhabitants of Paris, they find themselves led to this conclusion: That the application of Article 48 of the treaty entered into between the City and the Gas Company presents no element upon which this reduction could be based, since in the system pursued by the Company in 1880 for the manufacture of gas there is not found to be any new process, or anything foreign to the system employed in 1870, which might be of such a nature as to effect a considerable reduction in the net price of this product.

GRAND JUNCTION WATER-WORKS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held on Wednesday, the 15th inst., when the report of the Directors stated, in reference to the half-yearly statement of accounts submitted, that it would be perceived the "Directors have not been over-sanguine in their anticipation of an early return to that financial prosperity which in former years represented the normal condition" of the Company's affairs. The report continued:

Many causes—arising partly from renewals and remodelling of works, from exceptional accidents, from heavy parliamentary expenses, from inclemency of seasons, from commercial depression, but mainly from the expenditure, within the last two years, of a sum of £124,000 in the construction of important new works, undertaken for the increased efficiency and purification of the water supply, which your Directors determined at, whatever sacrifice of pecuniary gain, to carry out—have no doubt tended to retard the evidences of this prosperity, but only for a period now passed, a period which culminated at the very time of the negotiations for the sale and purchase of the undertaking. The Government agent was distinctly informed, that in calculating the selling value of your rights and property on the figures of 1879, he was purchasing the concern under circumstances disadvantageous to the Shareholders.

Since the date of these negotiations an altered state of things has arisen. For the year ending Michaelmas, 1879, the increase of the Company's revenue was £3686. For the year from Michaelmas, 1879, to Michaelmas, 1880, the increase is now shown to be £10,074. There is one point moreover connected with the negotiations of 1879, to which it may be desirable to refer. The sum then agreed to as representing the Company's annual increase of profit was £5250, whereas the increased profit for the last financial year ending Michaelmas, 1880, has amounted to £7553, and as no further capital will be required for new and renewed works for some time to come, there is no reason why the Company's profits should not continue in the future at something like that amount. Nor has this state of things arisen from any avoidance of expenditure in the proper maintenance of the works. Your Directors can report to you from personal inspection that the whole of the Company's establishments at the several stations are in excellent order and efficient working condition. The new works in progress at the Hampton station—namely, the three filter-beds and the covered reservoir, are now all but completed, and will be of no small value for the further purification of the water. The additional works which your Directors contemplated in connection with these filters—namely, the erection of a pair of pumping-engines, so as to complete the separate system of supply for the country district, and which the Company were prevented contracting for during the agreement with the late Government—will now be at once proceeded with.

In order to meet the desire that has been expressed in public quarters for constant

supply, your Directors have thought this a fitting time to urge strenuously, and as far as possible to enforce, in all new building districts and estates the adoption of that system, and arrangements have been made to give the constant supply forthwith to certain estates. It was to meet such contemplated change in the mode of supply, which it was believed would long since have been enforced upon the Company and upon the householders, that the Shoot-up-Hill high-level reservoir at Kilburn was constructed. That reservoir will now be taken into permanent use so as effectually to accomplish the desired purpose. It is hardly necessary to add that the Company have been and are ready at all times to afford constant supply throughout any portion of their district, should application be made for it, in accordance with the conditions required by the Act of Parliament.

The statement of accounts showed that the revenue for the half year amounted to £78,145 13s. 5d., while the balance carried down after payment of all ordinary expenses was £46,690 17s. 7d. Instead, however, of crediting the interest and dividend account with this entire sum, it was thought desirable by the Directors to set apart a reserve account of £2500 "to meet such exceptional and contingent charges as stand apart from the ordinary working expenses of the Company. This contingency account is thus debited for the past half year with an expenditure of £924 13s., the cost of the negotiations with the late Government, and of proceedings for the protection of the Company's interests before the Parliamentary Committee under Sir William Harcourt." The actual result of the working of the concern during the last six months was as follows:—After providing for a dividend charge of between £1600 and £1700 on the new share capital, as well as for the above-named £924 13s. for exceptional law and parliamentary charges, the accounts showed a clear surplus profit at the rate of 8 per cent. per annum on the general share capital, out of which the Directors recommended the carrying of £2500 to a separate account, as stated, the payment of a dividend at the rate of 7½ per cent., and the carrying forward of the balance of £600 to the credit of the next half year's accounts.

CHELSEA WATER-WORKS COMPANY.

The Half-Yearly General Meeting of this Company was held at the Office, Commercial Road, Pimlico, on Thursday last—JOHN DEEDES, Esq., in the chair.

The SECRETARY (Mr. A. Gill) read the notice convening the meeting, and the report and accounts were taken as read.

The following are the principal features of the report:—

The revenue of the Company for the half year up to Sept. 30, 1880, exclusive of interest on moneys deposited, amounted to £50,901 6s. 11d., showing, as compared with the revenue of the same period of last year, an increase of £1322 12s. 5d. The charges for maintenance and management were £18,843 16s. 8d., showing, on similar comparison, an increase of £2033 14s. 7d. This increase—which is exceptional—is due to the cost of repairing the second pair of pumping-engines at Surbiton, and to the cost of reinstating and repairing district pipes and works during the progress of the work of laying down wood paving, in substitution for granite, in some of the principal thoroughfares in the Company's district. The expenditure on capital account, during the half year, amounted to £1790 14s. 10d., and is composed almost exclusively of the cost of laying new mains and pipes in Fulham, where the open spaces are now being built over, and out of 4254 yards of pipes laid during the half year, 4002 yards have been used for the purpose of providing for the new water supply in that direction.

The quantity of water pumped from Surbiton to the covered service reservoirs on Putney Heath during the half year amounted to 1677 million gallons, being nearly 98 millions in excess of the quantity pumped in the corresponding period of last year, though at a somewhat lower cost. About 11 millions of this excess is due to the ordinary increase in the trade supplies, but, notwithstanding the efforts made by the Inspectors, there is reason to believe that considerable waste still exists in the smaller class of houses where the supply is constant and the fittings are of inferior quality.

During the half year 84 houses and stables have been pulled down for improvements, and 389 new supplies have been laid on, representing a future net water-rental estimated at £1252 per annum, exclusive of income from additional supplies by meter.

The several Vestries and District Boards have availed themselves of the opportunity afforded them quinquennially, by the Valuation (Metropolis) Act, 1869, to revise their assessments of the annual value of the Company's property, which will increase considerably the item of rates and taxes in the Company's accounts during the ensuing five years.

The Engineers report that the engines and pumping machinery are in good working order, and in the same state of efficiency as at the date of their last report, and that the water has been sent up in a very satisfactory condition, as shown by the samples taken daily from the main for examination by Lieut.-Col. Bolton. They also report that the reservoirs at Putney, the aqueduct over the river, and the works generally, are in good and substantial order.

The Select Committee—appointed to inquire into, and report on the expediency of acquiring, on behalf of the inhabitants of the Metropolis, the undertakings of the London Water Companies, and to examine and report whether the agreements provisionally entered into (with the late Mr. E. J. Smith, as negotiator for the late Government) for the purchase, would furnish a satisfactory basis for such an acquisition, and to inquire also as to the Companies rating powers—issued their report on the 3rd of August last. Consequent on this report, a notice has been given in the *Gazette* of an intended application to Parliament in the ensuing session to create a Public Water Authority, representing the consumers; to confer on that Authority such powers as may be necessary or expedient for securing, at reasonable rates, "a greater efficiency in the supply of water;" to acquire and utilize, as far as may be deemed expedient, existing sources of supply; to ascertain whether recourse may not be had to other sources of supply, and to promote and prosecute in Parliament such measures as may be necessary for carrying out these objects, with power to purchase (by agreement, or arbitration, or compulsion) all or any parts of the Companies undertakings. The Directors regret that it will therefore again become necessary to enter upon another expensive contest in defence of the rights of the Proprietors. They do so, however, without any fear as to the result, as they are satisfied that the terms of the agreement with the late Mr. E. J. Smith for the purchase of their property were such as could be supported under an arbitration, and that the works of the Company as they exist are in every respect such as to satisfy close examination. It is freely admitted that they possess a power of supply greatly in excess of the demands of the district; and the increase in the Company's revenue corroborates, so far, the accuracy of the estimates.

The scheme promoted by the Lower Thames Valley Main Sewerage Board has been disallowed by the Local Government Board. The costs in this matter, as well as the costs of the proceedings in opposition to the proposed Purchase Bill of last session, were not settled at the date of the Government audit in November. They amount together to £1704 13s. 9d., and that sum has now been paid. It has been deemed just that the amount should be provided for out of the contingency-fund.

It is recommended that a dividend at the rate of 6½ per cent. per annum on the ordinary stock of the Company be declared and paid on the 5th of January prox.

The GOVERNOR, in moving the adoption of the report, expressed his pleasure at being able to state that the revenue for the half year ended the 30th of September last, exclusive of interest on moneys deposited, showed, as compared with the revenue of the same period of last year, an increase of £1322. The charges for maintenance and management, however, showed, on similar comparison, an increase of £2033 14s. 7d. This increase—which was exceptional—was due to the cost of repairing the second pair of pumping-engines at Surbiton, and to the cost of reinstating and repairing their district pipes and works. In the sixth paragraph of the report an increase in the Company's annual income was anticipated. It stated that "during the half year 84 houses and stables have been pulled down for improvements, and 389 new supplies have been laid on, representing a future net water-rental estimated at £1252 per annum, exclusive of income from additional supplies by meter." The next paragraph was of some importance. It stated that "the several Vestries and District Boards have availed themselves of the opportunity afforded them quinquennially, by the Valuation (Metropolis) Act, 1869, to revise their assessments of the annual value of the Company's property, which will increase considerably the item of rates and taxes in the Company's accounts during the ensuing five years." The parishes supplied by the Company were large, wealthy, and numerous—viz., Fulham; St. Mary Abbotts, Kensington; St. Luke, Chelsea; St. George, Hanover Square; St. Margaret, Westminster; St. Martin-in-the-Fields (partly); and St. James, Piccadilly (partly). The assessment of the Company over the whole of these parishes had been increased by £5000; and he was happy to be able to state that the matter had been settled without any appeal, though for prudential reasons the Company gave notice of appeal. The ninth paragraph referred to the provisional agreements which were entered into with the late Mr. E. J. Smith, as representing the late Government, for the purchase of their undertaking. Those agreements were before the Shareholders at their last meeting, but, as they were aware, they were not adopted by the Select Committee subsequently appointed, and in a few days, at the close of the year, these agreements would expire. Probably the terms contained in some of them would be adopted by some future Committee, but, in the meantime, as he had said, the agreements would be defunct at the end of the year. He then called attention to the notice which had been given of the intention to apply to Parliament next session to bring in a Bill constituting a London Water Authority, with power, *inter alia*, to purchase the undertakings of the Metropolitan Water Companies. After quoting from the official notice the objects of the Bill, he drew attention to the 11th paragraph of the report, and expressed his pleasure that after a long struggle the scheme promoted by the Lower Thames Valley Main Sewerage Board had been disallowed by the Local Government Board. The costs in this matter, as well as the costs of the proceedings in opposition to the proposed Purchase Bill of last session, were not settled at the date of the Government audit in November. They amounted together to £1704 13s. 9d., and that sum had now been paid. The Government Auditor had since assented to the proposed mode of paying the sum out of the contingency-fund, which amounted to over £17,000. These matters were expensive, and it certainly seemed that the amount might properly be taken from this fund, and after deducting it he was happy to say the fund would stand at a good figure.

The DEPUTY-GOVERNOR (Sir William Henry Wyatt), in seconding the motion, said the Governor had omitted to mention one very satisfactory point. Before coming to terms with the late Mr. Smith as to the price at which the Company's undertaking should be purchased, the Directors had to make an estimate of what their profits would be for the next 20 years. This was a long time over which to make a calculation, but still they did it, and on this they based the price; and it would be interesting to the Shareholders to know that for the past year it was estimated that the Company's profits would be £63,076, whereas they had been £63,511, showing an increase of £435. The Directors had not strained anything in making the estimate, and he believed the figures they had given would be borne out. If they could establish these figures they had nothing to fear from the undertaking being purchased.

Major BOILEAU, in supporting the resolution, referred to the main features of the report, and said that the exceptional expenses which were mentioned were quite beyond the control of the Board, but he hoped some of the outlay would eventually prove profitable. He believed all that could be done with regard to economy had been done by the Directors, who, it was quite clear, had shown a great deal of attention in the management of the Company's affairs, and he was sure the Shareholders generally must be greatly indebted to them.

The motion was then put, and unanimously agreed to.

On the motion of the GOVERNOR, seconded by the DEPUTY-GOVERNOR, resolutions were afterwards passed authorizing the Directors to pay the dividends on the several preference stocks of the Company, and a dividend at the rate of 6½ per cent. per annum on the ordinary stock of the Company.

Major BOILEAU moved a vote of thanks to the Governor and Directors for their able management and careful attention to the interests of the Company.

Major BARTON seconded the motion, and it was carried unanimously.

The GOVERNOR, in acknowledging the vote, observed that his colleagues and himself regarded it not merely as a compliment, but as an expression of the feelings of the Proprietors that in their judgment the Directors had done as well as they could for the Company. He would not say there were "breakers ahead," but there were matters requiring the constant attention of the Board, and he assured the Shareholders that his colleagues and himself would give their best attention to those matters.

The proceedings then terminated.

CITY OF ST. PETERSBURG NEW WATER-WORKS COMPANY.

A Meeting of the Debenture-holders of this Company was held on Monday last week, at the Cannon Street Hotel, E.C.—Mr. W. T. WESTERN presiding—under the sanction of Vice-Chancellor Hall, to enable the Company to carry out an arrangement for the reorganization of the Company, based on a scheme to the following effect:—

The Directors may issue debentures of the Company to the amount of £60,000, to be called "A" debentures, and to bear interest at the rate of 6 cent. per annum; such debentures shall constitute a first charge upon the Company. The Directors may create and issue debenture stock of the Company to the amount of £60,000, to be called "B" debenture stock, to bear a preferential interest at the rate of 7 per cent. per annum; such interest shall be cumulative, but payable only out of the net earnings of the Company after providing for the interest of the "A" debentures, and such debenture stock shall constitute a charge upon the property of the Company ranking next after the "A" debentures. £55,750 of the "A" debentures and £59,652 10s. of the "B" debenture stock shall be applied to redeeming or commuting the existing debenture debt of the Company, in accordance with the scheme of arrangement agreed to by the debenture-holders. The Directors may issue the remainder of the "A" debentures and of the "B" debenture stock to such persons and upon such terms as they shall think fit. Subject to the charge created by the "A" debentures and "B" debenture stock, the Directors may raise and borrow upon debentures, or by the creation and issue of debenture stock or otherwise, such further amounts from time to time, at such rates of interest and upon such terms, as a general meeting may authorize.

The CHAIRMAN said he had been appointed by Vice-Chancellor Hall to act as Chairman of the present meeting, and report to him the result of the several resolutions which would be proposed that day. They would remember that at a meeting held in July last he advised some arrangement of the Company's affairs, by which they could be more efficiently carried out and more equitably adjusted. At that meeting a Committee was formed to draw up a scheme, and this had been done, it being in detail to the effect of the general suggestions he had thrown out, the principal variation being the substitution of 7½ for 6 per cent. interest, and a share of the profits. The question for them to consider was, whether they would now give their approval to the scheme or not, and he might add that he had already received a large number of assents. They would have preferred carrying out the arrangement amongst themselves, but were advised by their legally constituted Solicitors that it could not be carried out except with the cognizance of the Court of Chancery, which would give a more binding effect to their proceedings. A debenture-holder having presented a petition for liquidation, they allowed the order to issue, but it would be set aside under the scheme, and the reorganization completed. With regard to Russia and the Company, the Courts there would take cognizance of any question that might arise between the public and the Company as to the supply of water, and simply record the action of any of our own Courts. This, he thought, was a matter for congratulation. According to the accounts which had reached him that morning from the Manager at St. Petersburg, there was no doubt about him sending the money in

due course, and therefore there would be no delay except what might arise through the Court of Chancery. He believed the scheme would be equally advantageous to both Debenture-holders and Shareholders, and concluded by recommending them to adopt it, moving a resolution to that effect.

Mr. R. S. GUINESS seconded the motion, which was carried unanimously.

A meeting of Shareholders was then held, to whom the CHAIRMAN detailed as before the circumstances under which the meeting was held, and concluded by moving the adoption of the scheme.

Mr. GUINESS again seconded the motion.

A SHAREHOLDER asked what prospect the Chairman could hold out as to the Shareholders being able to touch any money. He thought if they were to go on year after year until the "Greek Kalends," it would be better to know the worst of it, and wind up the affairs of the Company.

Mr. SANGSTER said to talk of winding up a Company like theirs was ridiculous and suicidal. They had their works at St. Petersburg in first-class order, and a number of hospitals, barracks, &c., were coming to them for water, and there was a considerable increase of private consumers. He then went into figures to show that should their present prospects hold good there might be a dividend in two or three years. At all events it would be madness for them to wind up the Company, as by such act there would be nothing either for Debenture-holders or Shareholders.

After some further discussion, the motion for the adoption of the scheme was again carried unanimously, and the proceedings terminated.

NEWPORT (MON.) WATER-WORKS COMPANY.

A Special Meeting of this Company was held on Wednesday, the 15th inst., for the purpose of deciding as to the proposed increase of capital and extension of works.

The CHAIRMAN (Mr. S. Homfray) having briefly stated the object of the meeting, moved the adoption of the following resolution—"That the application to the Board of Trade for a Provisional Order, to be confirmed by Parliament, authorizing this Company to raise additional capital for the general purposes of their undertaking, is hereby assented to and approved of by the Shareholders and Proprietors of this Company."

The VICE-CHAIRMAN (Mr. J. Lawrence), who was requested by the Chairman to state the position of affairs, said after careful consideration of the probable increase in the population of the district, and the consequent greater demands that might be expected upon the water supply, the Directors had decided that it was essential that they should effect such an extension of the works as would involve a considerable outlay. In accordance with the estimate of their Engineer (Mr. Taylor), £35,000 would be required for the construction of a bye-wash at the upper reservoir, to prevent flood water getting into it; £20,000 for a new subsiding and storeage reservoir and works connected with it at Ynysbro, which would be of vast importance to the Company, as it would afford them additional storeage for 20 million gallons of water, and enable them in times of heavy floods to receive the water into the subsiding-pond, so that it could be introduced into the town in a pure state. The next important work was the deepening of the lower reservoir, which was very shallow at one end. The cost of deepening and re-pitching it was estimated at £14,000. For alterations at St. Woollos tank, where they propose to build two workmen's cottages, £1000 would be required; and it would cost £500 to convert the old engine-house into offices and board-room. The covering over of the reservoir was estimated at £3000, and other contemplated works, the chief of which was the laying down of service-pipes, was set down at £32,250. The total amount of the estimate (allowing 10 per cent. for contingencies) was £94,875, and the Directors proposed to obtain from the Board of Trade powers for raising a further capital of £100,000, of which £80,000 would be in shares, the remaining £20,000 to be borrowed. Thus prepared, they hoped to be in a position to meet any increased demands upon the water supply which might reasonably be expected. It was indispensable to the interests of the Company that the scheme should be gone on with, and he hoped the Shareholders would rely upon it that the Directors would study their interests in the future as they had done in the past. The Directors were unanimous in advocating the scheme, and they hoped to be able to keep the dividends of the Shareholders up to the maximum of 8 per cent.

Mr. T. GRATREX, in seconding the adoption of the resolution, said he felt convinced that the scheme would prove beneficial to the Company.

The CHAIRMAN observed that very likely not half the amount of new capital asked for would be raised for 10 years to come.

Colonel LYNE expressed a desire to be informed as to the probable requirements of the next few years, and as to how it was proposed to allot the shares.

The VICE-CHAIRMAN replied that it was estimated they would require to expend £34,000 or £35,000 at no very remote date—probably in one and a half or two and a half years. As to the shares forming the new capital, it was the intention of the Directors to allot them *pro ratâ* to the Proprietors. He was happy to say at the present moment the improvement in the rents was tolerably satisfactory, and enabled the Board to look forward with some confidence to being able to continue to pay a dividend of 8 per cent., though he was not prepared to say that there might not be a year or so during which they might not be able to quite make it up.

The resolution was then put to the meeting, and adopted unanimously, and the proceedings were brought to a close.

RECENT EXTENSIONS AND ALTERATIONS AT THE SALFORD CORPORATION GAS-WORKS.

In an article, in the *Salford Weekly News*, on "Public Improvements in Salford during the year 1880," our contemporary remarks that in the year which is just closing the Corporation of Salford have been busy carrying out many important works for the improvement of the borough. No new undertakings have been commenced, but much has been done towards completing schemes which were formed in years gone by. The article then proceeds:

Perhaps the most extensive and costly improvements that have been made in the borough during the past few years have been in connection with the gas-works. It will be remembered that some three years ago—in 1877—Mr. Samuel Hunter, the Gas Engineer, laid before the Committee an estimate, which showed that the works at Lamb Lane, Liverpool Street, and Regent Road could be placed in an eminently satisfactory condition, and made equal, perhaps, to any in the country, for an outlay of £160,000. The estimate was accepted by the Council, and the work was at once proceeded with. After three years the works are nearing completion, and it is found that the £160,000 was a most accurate estimate, for the extensions that are now in hand or have been finished have cost £126,000, and the remaining £34,000 will just about cover the expense of all the other improvements that can possibly be required.

The alterations that have been made at the Lamb Lane works comprise the pulling down of the old offices and the erection of new ones, the erection of additional store-rooms, workshops, and governor-house, the remodelling of the engine, exhauster, and boiler house, and additions to the purifying apparatus. On these works some £8500 will be spent. The new offices consist of a three-storeyed building in the plain Gothic style of architecture. The main entrance is surmounted by a tower, and on either side there are spacious rooms for the accommodation of the persons connected with the gas department. On the left-hand side of the entrance is a fine room in which the indoor clerks will be engaged, and the Indoor Superintendent will also have a small office here. On the other side the outdoor clerks, the Outdoor Superintendent, and the meter inspectors will be provided for. At present some of these have offices at the Salford Town Hall. On the upper floor the Gas Engineer will have his office, and there will also be a committee-room, a photometer-room, a laboratory, and various other offices. The cellars will be utilized as store-rooms, dining-rooms for the workpeople, and for other purposes. To the left of this building are the newly-erected stores, where will be kept the various implements required in the manufacture of gas. The largest part of the buildings, however, will be used for the make, repair, and storeage of gas-meters. The timekeeper will also have his office here. In the new engine and exhauster house, which are at the back of these offices, there are two fine boilers that are alternately used to drive a horizontal engine which is in adjoining premises, and which works the exhausters that are also in this room. All these are new, and are made upon the best modern principles. Preparations are now being made for the reception of a second horizontal engine, so that should the first get out of order no inconvenience may be felt. The only other new apparatus that has been supplied to this station is one of Kirkham, Hulett, and Chandler's patent washer-scrubbers. All the old apparatus, however, has been put in thorough working order, the works having been stopped for some three months to admit of this being done.

At the Regent Road (No. 2) station there has been an almost entire remodelling of the works, and very large extensions have been made, embracing new retorts, condensers, exhausters, washers, scrubbers, purifiers, workshops, and a governor-house, all of which have cost about £41,000. The whole of these improvements have not been carried out during the last year, however. Since last Christmas one of the old retort-houses has been enlarged and fitted up with 294 retorts, 20-inch by 16-inch. The retort-house is 68 feet span and 230 feet long, and cost altogether about £12,000. All the retorts are now in working order, but only a few of them have yet been used. In connection with this retort-house a new chimney, 170 feet high and 14 feet square at the bottom, has been erected. The only other extension of this station which has been made during the year is the building of a large new brick tar and ammoniacal liquor tank, 45 feet long, 25 feet wide, and 25 feet deep. The tank is divided into three compartments. The first compartment, into which the tar and liquor from the retorts and other apparatus are first deposited, is capable of storing 82,000 gallons; and the second and third compartments will each hold 36,000 gallons; thus making a total capacity of 154,000 gallons. All the walls have been built in cement, and the bottom is formed of cement concrete. The top is covered by brick arches, which are paved over to the level of the yard.

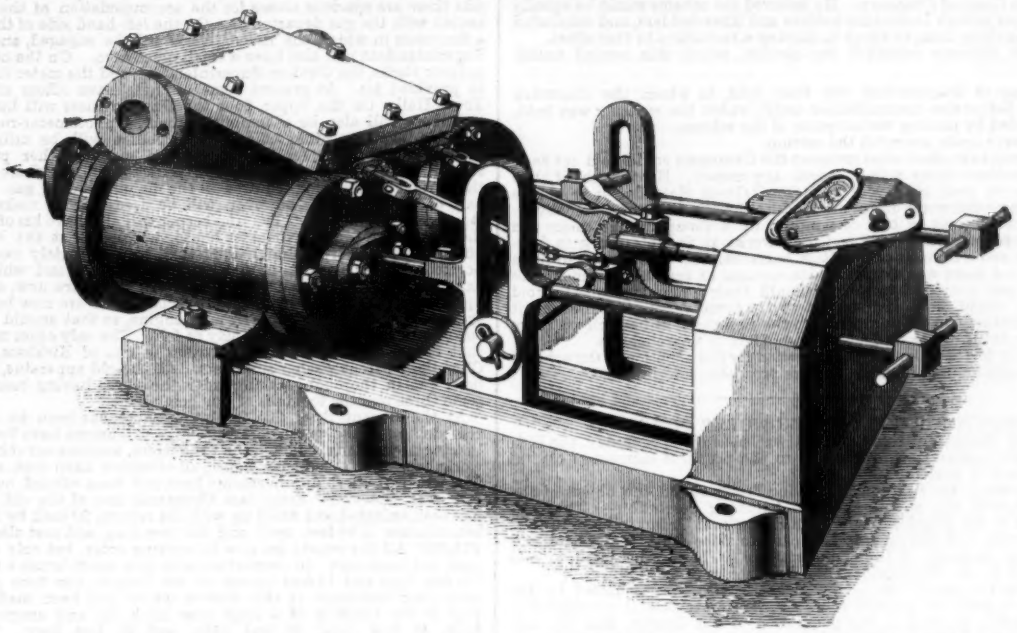
The most important extensions in connection with the Salford Gas-Works have been made at No. 3 station in Liverpool Street, which is divided from No. 2 station by lines of the London and North-Western Railway Company. Until recently this station consisted of nothing more than a retort-house and storeage for tar, ammoniacal liquor, and gas; that is to say, there were no purifying apparatus, station-meters, and exhausters, and all that could be done there was to carbonize the coal. Now, however, these deficiencies are being supplied at a cost of about £70,000, and the station will be made complete in every respect. Two of Aitken and Young's analyzers, each 12 feet in diameter and 60 feet high, have been erected on massive masonry foundations. From these the gas will be carried into six wrought-iron annular condensers, each of which is 4 feet in diameter and 40 feet high. The analyzers and condensers, which are of the most modern construction, and fitted with the latest improvement, are being erected by Messrs. R. Dempster and Sons. There are four exhausters, which will be worked by two horizontal engines. Each is capable of passing about 84,000 feet of gas per hour. The exhausters, engines, and the station-meters, of which there are two, each capable of passing 100,000 cubic feet of gas per hour, are being erected by Messrs. R. Laidlaw and Son. The gas from the exhausters goes to the scrubbers, of which there are two, each of which is 12 feet diameter and 60 feet high. On the top of each is a machinery room, which contains the apparatus needed for distributing the ammoniacal liquor through the scrubbers, and which is reached by means of a spiral staircase round the outside. Two new washers, by Kirkham and Co., next receive the gas, which afterwards goes to the purifiers. These consist of six huge iron boxes, each 24 feet square and 5 feet deep, which are partly filled with oxide of iron. These are supported on iron girders and columns, and enclosed in a house 68 feet span by 190 feet long. This house is constructed for 12 purifiers, all of which will no doubt in course of time be required, but it is not intended to erect them at present. The base of the house will be used for revivifying the oxide of iron, which, after this process, will be lifted from the floor up to the boxes by four elevators. The lids of the purifiers, each of which weighs 8 tons, will be lifted by hydraulic power. All the ironwork connected with this department is being furnished by the Pearson and Knowles Coal and Iron Company, Limited.

We may mention that some of the works are enclosed in a fine block of buildings, which, however, as it is midway between Liverpool Street and Regent Road, cannot be seen to advantage, the only point from which it is at all observable being Egerton Street. The purifying-house adjoins Egerton Street, and on a line with it stand the exhauster and engine house, the meter-house, the photometer-house, and the store-house. The latter is provided with a tower and clock from which the workmen will take their time. All these buildings, which are of a moderately plain character, together with all the other brick and masonry foundations that have been required, have been supplied by Mr. William Healey. All the pipes connected with these works are so placed that access can be had to them without loss of time, should any accident ever happen. We are informed that with the works at present in use 3½ million cubic feet of gas can be made per day, but when the Liverpool Street works are completed this quantity can be increased to 5½ million cubic feet per day—a much larger quantity than is at present required, but not more than, it is presumed, will in course of time be consumed within the district of the Salford Gas Committee.

REDUCTION IN THE PRICE OF GAS AT SWANSEA.—The Directors of the Swansea Gaslight Company have decided to make a reduction of 3d. per 1000 feet in the price of gas, to take effect on the 1st prox.

CONSCIENCE MONEY FROM A GAS CONSUMER.—The number of the *American Gaslight Journal* for the 2nd inst. heads the following letter, received from a correspondent at Philadelphia, as "Something Astonishing"—"Mr. Editor: I enclose you a slip from the *Washington Evening Star*. When gas consumers admit that they have done a gas company an injustice, and voluntarily make restitution, the Millennium must be near at hand. 'Our city gas company received an anonymous note to-day enclosing one dollar, and stating that it belonged to the gas company. The company has several times during the past few years received sums of money which the senders state have been wrongfully obtained.'"

DUNCAN'S PATENT WATER-METER.



We have recently been reminded of a promise, made in the JOURNAL some time since, to give an illustration of the meter patented by the late Mr. Thomas Duncan, Engineer-in-Chief of the Liverpool Corporation Water-Works. Many hundred meters have been made under the patent, and have been in use for some years in Liverpool and other places. They have also been adapted so as to become power engines, if needed, and are specially applicable for working the bellows of organs. Several of the leading organ builders use them, and have expressed themselves highly satisfied with their action; as they are silent, and under the immediate control of the organist. They can be placed either horizontally or vertically, and are attached to the levers which work the bellows by means of the crossheads on the connecting-rods.

The above engraving shows so clearly the mechanism of the meter, that detailed description is unnecessary. It consists of two cylinders, with pistons and slotted piston-rods working a short crank-shaft. The water under pressure is admitted alternately to each side of the pistons, and thus a rotary motion is given to the shaft. A counter is attached to the shaft, and thus a correct register is kept of the quantity of water passing through the cylinders.

PRESENTATION TO MR. MAGNUS OHREN.

On Friday last an interesting ceremonial took place in connection with the Crystal Palace District Gas Company, Lower Sydenham—namely, the presentation to the Secretary, Mr. Magnus Ohren, by the officers and workmen, of a testimonial in commemoration of what was happily termed his silver wedding (his twenty-fifth year of office) with the Company. The presentation was made in the van-shed, the only available place under cover extensive enough for the purpose, and where the men, after having received their week's wages, assembled in large numbers in front of three vans, which formed an extemporized platform for the speakers and the officers of the Company.

Mr. C. GANDON, the Resident Engineer, addressing Mr. Ohren, said: A very agreeable duty has devolved upon me this evening. I have been requested, on behalf of those present and of all the *employés* of the Company, to offer you our sincere and hearty congratulations upon the completion of what must be an interesting period of your connection with the Company, this being the twenty-fifth anniversary of your holding the office of Secretary. During the whole of this long period you have earned the esteem and respect of all with whom you have been associated. I do not know whether I should be right in referring to this period as your silver wedding, for it is not always agreeable to be reminded that one is getting older every day; but it must be a matter of congratulation not only to yourself, but to all concerned, to know that your long association with the Company has been a successful one, as is evidenced by the fact that the Company have risen from very small beginnings to their present state of great prosperity. It is the belief of all of us that you have studied in every possible way to promote the welfare and comfort of the *employés*. To you they are indebted for the many little acts of kindness which have been shown to them by you on behalf of the Directors of the Company—I refer especially to their pleasant summer outings, and also to another little interesting ceremony that is about to take place. I have been asked by them to express their cordial thanks to you for all your kindness, and to request you to accept these testimonials of their esteem. The gifts have been subscribed for by all the officers and men, and consist of a handsome massive silver loving-cup,* which I now present to you, and a diamond ring, that will remind you of this your silver wedding. I think I need scarcely add more; the inscription shortly expresses the feelings of all, and I have merely to ask you to accept this testimonial, wishing you "A Merry Christmas and a Happy New Year," and trusting that you may long be spared to remain with us in your present position. We all wish most cordial health and happiness to yourself, Mrs. Ohren, and your family.

These remarks were received with loud and prolonged cheers.

Mr. OHREN said: Brother officers and brother workmen, for we are all workers in this great hive—and that we work together in goodwill and harmony is fully shown by the object which now brings us together—I feel that I should commence any remarks I may have to make by stating that this is the happiest moment of my life, and that I thank you from the bottom of my heart. I cannot, however, say this without reservation, for I feel that I ought to scold you for the too great zeal you have evinced in my favour. The first intimation I had that a presentation would be made to me was from the Chairman of the Testimonial Committee. The Committee thought that it would be best that, of the several things which they considered would form an acceptable present, I should be asked to make a selection. I need not say that when the amount of money collected was mentioned, I felt that I could not possibly accept so valuable a testimonial, and I desired that it might be reduced one-half. This, however, I was told could not be, since the money was not only subscribed, but paid, and in the hands of the Treasurer. But I felt that I really ought to take the opportunity of scolding you for the extravagant manner in which you had responded to the call made upon you, and I can only forgive you on one condition. As Mr. Gandon has said, I look upon this as my silver wedding to the Company, and the condition I impose is this—that in twenty-five years time, at my golden wedding, you shall be less lavish with your money in presenting your testimonial. (Cheers and laughter.) Now, as that is off my mind, I may turn to the more legitimate way of recognizing such an event, and express my debt of gratitude to you for this lasting proof of your esteem and regard. Twenty-five years ago this day I took charge of these works. I say these works, although they were very different from the present works. At that time we had in use four beds of retorts, and were carbonizing 10 tons of coal per day. We have now 50 double or through beds of retorts, more than equal in size to 100 of the old beds, and we are carbonizing 257 tons of coal per day. At that time we had five stokers and a total of eight constant men; we have now 84 stokers and a total on our pay-sheet to-day of 343 men and boys. We then had one gasholder to contain 110,000 cubic feet of gas; we have now five, having a capacity of 2,430,000 feet. We then had 500 customers; now we have 8500. (Cheers.) We may imagine what Sydenham was at that time. It was first lighted by the Sydenham Gas Company in September, 1852. The works were very small, and, in fact, Lower Sydenham was rather out of the world. Let me give you an idea of its remoteness from London. The London, Brighton, and South Coast Railway had then only been a few years in existence. One of our service layers required a pick, and was anxious that it should be of a certain weight and size. I told him he might go to the Borough and choose one or two for himself. "The Borough?" said he. "Where is that?" (Laughter.) I told him it was a short way from London Bridge, and that if, when he got out of the train, he turned round to the left, he would soon come to the place. "Why," said the man, "that is in London. Oh! I should not like to go there, Sir, because I might lose myself." (Laughter.) I told him that if he had never been to London he should have the opportunity then; but he nearly cried to think of going—in fact, he would not go, and I had to send some one else. Is Evans here?—the inspector of main layers—well, he is the man. (Much laughter.) In the spring of 1854 the Crystal Palace District Gas Company took a lease of the Sydenham Gas-Works. The Crystal Palace was commenced at Sydenham in 1852, and was opened in 1854, and from that time our works began to grow. The Metropolitan Board of Works were constituted about this time—in August, 1855—and the Boards and Vestries were commencing their duties with vigour; but it was not till long afterwards that we had lamps in this district. For a considerable time I had to walk home from the office to the Railway Station with a lantern. I used to leave it at the station at night, and bring it down with me on my return in the morning. There were ditches on each side of the road, and travellers were so rare that if one fell in he might remain there a week before any one came that way to pull him out. (Laughter.) All our roads are now lighted, and there are at present about 2000 lamps in the Company's district. Thus we have grown, and to-day we are one of the most successful gas companies in England. But I must not detain you longer. It was hoped that we might have met and had supper together, but this was found to be entirely out of the question—first, because we have no place nearer than the Crystal Palace that would hold us all; secondly, because you could not all leave together, and at a season like this our special care and attention are required in order that our customers may be well supplied with gas. If, however, you do not get a supper, you will, by the liberality of the Directors of the Company, be supplied each with a joint of meat before you leave. (Cheers.) There are 343 joints waiting to be carried off. You cannot say that we offer you the "cold shoulder"—(laughter)—for most of them are legs such as any

* The cup, of beautiful workmanship of the seventeenth century, and weighing 73 oz., was supplied by Geo. Lambert and Co., of Coventry Street, W., and bears the following inscription:—

This Cup, together with a Diamond Ring,
was presented on Dec. 24, 1880,
to
MAGNUS OHREN, Esq., Assoc. M. Inst. C.E.; F. Chem. S.,
by the Officers and Workmen of the
Crystal Palace District Gas Company,
in commemoration of the completion, this day, of his 25th year of office
as Secretary of the Company,
and in testimony of their appreciation of his uniform kindness
and interest in their welfare during the whole of that long period.

of your wives may be proud of—(loud laughter)—stop a bit, I have not finished the sentence. I mean, when well cooked, and served up at her husband's table. I must now conclude by again thanking you for these beautiful articles you have given to me. The cup, when in use in winter or summer, will bring to mind the many days we have passed so pleasantly together, and I shall never look upon the ring without thinking of the great pleasure I have experienced this night, and I again thank you not from the bottom of my heart, but with my whole heart. (Loud cheers.)

Mr. ARLISS (the Chief Clerk) then proposed that three cheers should be given to Mr. Gandon, the Chairman and Treasurer of the Testimonial Committee, adding that Mr. Gandon and Mr. Ohren were like the Siamese Twins, so completely were they bound up together in the interests of the Company.

The cheers having been heartily given, the men adjourned to another part of the works, where the Christmas joints were distributed, each man receiving a very handsome piece of meat for his next day's dinner.

CHRISTMAS AT THE YORK GAS-WORKS.

On Friday last, when the workmen at the York Gas-Works assembled for their wages, Mr. C. Sellers, the Company's Secretary, gave his usual Christmas address. He said: Fellow-workmen, let me again express the pleasure I feel at meeting you once more upon the social platform of Christmas, and while I give to each and all of you my best wishes, let me hope that health and happiness may rest upon all your homes. Home to me is a vital question, because I know, and you know, that where a fireside lacks comfort, men and their families are very apt to go astray. On former occasions I have referred to Christmas customs, and pointed out the folly of excessive indulgence in what are called the drinking habits of Society. I shall not now dwell upon this point, but at once dismiss all sentiment, and repeat what I have often told you before, that for a man to be drunk is to be degraded, vulgar, and unmanly. I am sick of having to put the question to all new comers upon the works—are you steady? or are you sober? It is simply a polite way of saying do you ever get drunk and make a fool of yourself? But these remarks do not apply to our old hands, for in respect to sobriety I am proud of them. I will just tell you of an observation I made upon this subject on the Continent last summer. I was in Antwerp, Brussels, and Paris, three of the largest cities in Europe. I was in the streets at all sorts of times, but although I went through working-men's quarters in Antwerp and Paris I never saw a man drunk, nor did I ever see a dirty or shoeless child. How far this sobriety—noticed by others as well as myself—in France and Belgium, has to do with the fact that manufacturers there can, in ironwork and other trades, more than compete with English manufacturers, I am not going to say, but you will all agree that, socially, morally, and commercially, sobriety is an important item in the prosperity of any people. And now, for our mutual benefit, let me direct your attention to a prevailing evil not only amongst workmen, but in Society generally. I mean the fault of people setting up their opinions for facts, and speaking with confidence about things when they have scarcely a tittle of foundation for what they say. In business this practice is a nuisance, and as our business increases causes no end of trouble. In fact, you may take it that when a man raves, and is prepared to risk his life upon his opinion, you will always find him in hot water, and, as a rule, wrong. Such men forget that in a Court of Justice, with plenty of swearing on both sides of a case, it takes twelve jurymen to find the truth, and sometimes even twelve cannot find it. Of course, I must say one word about our old friend, the electric light. We are building additional works, and are about to assume larger proportions than we have hitherto done. Some people shake their heads ominously—although we know that many anti-gas folks have very little in their heads to shake—and say that we shall not want the new works, that the electric light will take the place of gas, and that we shall be nowhere. Now, without going into detail, and without wishing to depreciate the electric light, let me, with the greatest confidence, parody Tennyson's "Brook," and tell you that, with the best and most independent scientific information upon the subject, I am decidedly of opinion, speaking practically, that—

Light may come, and light may go,
But gas goes on for ever.

Over a hundred little presents, in the shape of books, toys, &c., which Mr. Sellers had provided, were then distributed amongst the men for their children.

THE RATING OF THE SHOTLEY BRIDGE GAS-WORKS AND PLANT.

A settlement has just been come to between the Shotley Bridge and Consett District Gas Company and the Lanchester Union Assessment Committee as to the disputed valuation of the Company's works and plant. As far back as the July meeting of the Assessment Committee, the rating of the works was taken into consideration, the main facts of the case being as follows:—

The Company's property extends through five different townships or parishes, and the Overseers of one of the parishes—viz., Benfieldside—within which the manufacturing plant, buildings, &c., are situated, had increased their assessment against the Company from £360 to £500 net. They alleged as their reasons for so doing that in their parish alone the Company had expended £10,000; that all the land, buildings, manufacturing plant, and cartage over the highways was in their parish; and that whilst the adjoining parish—Consider—had none of these burdens, it had an equal rateable value to Benfieldside parish, simply on account of a little greater consumption of gas. The Overseers condemned the principle of rating on receipts and expenditure, maintaining that capital cost was the proper basis of valuing the works, and that £140 more rateable value was fairly due on the capital cost of the works at 5 per cent.

The Secretary of the Company (Mr. M. Richley) appealed against the assessment, and stated that the works, as a whole, had been valued some years ago by Mr. T. F. Hedley, a gentleman whom the Assessment Committee employed to do it for them, and who made an analysis of the works and their earnings in each parish, distributing the same accordingly. Since that time all the parishes had increased their assessments as the works advanced, and to this the Company had never demurred; but now it was necessary to do so, as the £140 increase proposed followed closely upon previous advances, and there were really no grounds for any single parish taking in hand and valuing the Company's works in this way piecemeal. In support of his contention he read the opinion of Justice Blackburn, in connection with the appeal of *The Phœnix Gas Company v. The Parish of Lee*, who said: "The rateable value of the premises is to be determined, according to the Parochial Assessment Act, according to the rent that a hypothetical tenant, making the suitable deductions, would give for the rateable property, and the sessions had quite properly proceeded to try to ascertain that. The property in this individual parish is a portion of a much larger property which the Gas Company possess in this parish and in others. The first thing the sessions had to do was to ascertain the rateable value of the entire thing which the Company possessed, and afterwards to see what portion of it belonged to this parish." This, Mr. Richley said, was now the custom observed in all practical valuations of gas-works; and the Company objected to their works being assessed on capital cost. They also protested against the Overseers doing it in pieces, as contrary to the principle of the Parochial Assessment Act, as laid down by the Superior Courts.

After some further questions relative to the works, Mr. Richley was asked to retire, and, on being recalled, the Committee admitted that it was evidently irregular to assess the Company in the manner attempted, and they would adjourn the case either to call in a practical valuer, or to be supplied with copies of the Company's reports for the three previous years, and a statement of the capital expended in each township, to aid them in making their own valuation.

At the next meeting of the Assessment Committee the Clerk read a letter which had been addressed to him by Mr. Richley, in the course of which he said: "Our Directors are willing to afford all necessary information, to test the rateable value of their works; but are of opinion that, as their works are partly in a Northumberland township, and others in Lanchester Union, the balance-sheets applied for would not lead you to the point as regards Lanchester Union. Without going into the tedious process of abstracts and measurements for capital expended over the six townships, the Directors think the simplest mode of arriving at the assessment of the various places is on the principle already laid down—*i.e.*, the parochial earnings. I have gone into the matter by Mr. Hedley's process of valuing, and find that the whole rateable value is within a few pounds of what it now stands at, viz.—£898 net; manager's house, £12 10s. —total, £910 10s. Your Committee put down an increase of £135, to which our Directors could not assent, as it is much higher than the value placed upon other large works in the Union. However, to save a very tedious and troublesome inquiry, we are prepared to submit to an increase of £82, making the present £898 up to £980, and your Committee to re-distribute it accordingly, after giving Benfieldside township its allowance in respect of the works, lands, and buildings therein situated. I stated before your Committee what the percentage of earnings was in each township, viz.—Benfieldside, 31·9; Conside and Knitsley, 34·9; Ebchester, 6·6; Iveston, 13·3; Medomsley, 13·3. I further stated that the amount allowed, by order of the valuer, to Benfieldside, in respect of works, land, and all the *indirectly productive capital* —which at that time was estimated at £4000—was £140 net off the total sum. The same kind of capital we now estimate at £6000, and that at the same ratio would allow Benfieldside £210 for this description of plant. Now, should your Committee feel disposed to entertain the suggestion of our Directors—*i.e.*, to fix the total value at £980—and which they think is fully higher than the average round about the district, then they (the Committee) can easily divide it amongst the townships themselves from the figures already given; but it is clear that by the percentage of apportionment, as applied to the £770, that the distribution is not proportionate, and appears to be too high at Consett and Knitsley, and too low at Ebchester and Medomsley, and is more unjust to these two latter townships than to Benfieldside. It is possible Mr. Hedley might be led into some error in his apportionment by insufficient care being taken as to the boundaries of townships. However, that is now in your power to remedy, and the Directors hope that these suggestions will enable the Assessment Committee to effect an equitable settlement."

The following statement, showing the amended assessment proposed, was also read at the same meeting:—

Township.	Mr. Hedley's Valuation.	Present Valuation.	Rate according to Gas Company's Average.	Proposed Future Rate.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Benfieldside . .	323 0 0	360 0 0	456 0 0	463 0 0
Conside . . .	359 10 0	360 0 0	269 0 0	277 0 0
Ebchester . . .	8 10 0	17 0 0	51 0 0	54 0 0
Iveston . . .	78 10 0	100 0 0	102 0 0	103 0 0
Medomsley . .	36 10 0	56 0 0	102 0 0	103 0 0
Totals . . .	806 0 0	893 0 0	980 0 0	1000 0 0

In the course of the discussion, one of the members, in proposing that the rates be altered as above shown, said it was quite possible that there had been mistakes made in the valuation of the works in taking the boundaries of the varjous parishes; but he thought the matter could be arranged without going to the expense of a new valuation. If they struck a mean between the claims of the Overseers of Benfieldside and the statement of the Company—and the latter admitted that the value of their works had increased from £4000 to £6000—they would be going as near the mark as they could from the information supplied. The rate proposed was an increase of only £107 on that at present paid.

These figures were accepted by the Company subject to the assessment remaining undisturbed for a few years; and so, as stated above, a settlement has been arrived at.

AMERICAN GASLIGHT ASSOCIATION.

[From the "Official Report" in the *American Gaslight Journal*.]

(*Continued from p.* 977.)

After the reading of the paper by Mr. G. G. Ramsdell, on "Gas-Engines," which appeared last week, there was the following

Discussion.

Mr. CARTWRIGHT asked Mr. Ramsdell the price he charged for gas, so as to enable comparisons to be made in other places.

Mr. RAMSDELL said the price was 2 dols. per 1000 cubic feet. He added that he wished to say a word in reference to this question of price. The price of his gas was 2 dols. 50 c. per 1000 feet, but his Company had the idea that the machine was going to be an enormous consumer, and reduced the price to 2 dols. per 1000 feet; but he had since become convinced that it was a mistake to reduce the price of gas at all below the regular charge. He thought that considering the economy in the use of gas-engines, those who had them could well afford to pay the full price for gas.

Mr. LITTLEHALES asked what was the lowest day pressure the engines could be run with. This, he said, was a very important consideration. If they required a large pressure, of course, the leakage during the time they might be running would be in excess even of the advantage gained by the sale of gas. He found that it required about 10-10ths or 12-10ths of an inch, but supposed it would depend upon the size of the main.

Mr. RAMSDELL said his experience was very similar to this. He found after he had put the engine up, that he had made the connection too small. He ran from the main a 2-inch pipe, while he should have run the full sized 3-inch pipe. It was volume of gas that was needed, not pressure; they had very frequently run the engine when there was only 12-10ths of pressure on, but as a usual thing they had had to give 14-10ths to make the engine work well. He had, however, known of gas-engines being run at 8-10ths and 10-10ths, and was satisfied that, with proper sized pipes 10-10ths gave ample supply to drive any of them.

Mr. M'ELROY asked if there was any pulsation in the mains in the neighbourhood.

Mr. RAMSDELL said there was in an elevator building, almost 150 feet from the engine; also in the corner lamp next to the elevator; but none anywhere else. They were supplying gas round the same building, but there was nothing consuming gas within probably 300 feet of the elevator building. In this distance they had not had any difficulty.

Mr. BURTIS: You refer to the 17-horse power engine, do you not, as being supplied with the 2-inch pipe?

Mr. RAMSDELL said he did. The other engine was originally put up in the third storey; but they subsequently moved it into the basement. He should have done this himself; but did not know anything about it until the work was nearly all done, and then he found that the pipes, while they were ample above, were too small in the basement. He notified the proprietor that this would have to be changed, and he acknowledged the reasonableness of making the change. The pipes were only ¾-inch.

Mr. BURTIS: What is the size of that engine?

Mr. RAMSDEN said it was 1½-horse power. There was one put up since, where the gas came from a 4-inch main, and that was the one he referred to when he spoke of their running at 8-10ths and 10-10ths pressure. This was all they gave, and the engine was working satisfactorily when he last heard of it. He did not think, when the engines were put up properly, there was any trouble at all in getting them to do their whole work with the ordinary day pressure.

Mr. LITTLEHALES, in reference to the pulsation question, said there was a 4-horse power engine affixed to their main—about a 2-inch one for nearly 400 feet. At the inlet of the gas-bag the pulsation was perceptible; that was before gas entered the engine.

Mr. FORSTALL, in regard to the question of pressure, said he had had some 12 or 15 engines at work scattered throughout the city of New Orleans, but had not made any difference in pressure on their account. They ran at from 8-10ths to 10-10ths in the daytime, and caused no complaints whatever. The engines were run from a separate service, but, at the same time, alongside of the service through which gas for illuminating purposes was supplied, and they had never had any complaints. The engines were giving satisfaction in every case, and he had never been called upon a second time after they were started, even when they were in the hands of those who had never seen a gas-engine before.

Mr. HELME said he had seen a number of gas-engines put up, and had yet to hear the first complaint about them. In the case of one engine of 2-horse power he put up he ran a separate 1-inch service-pipe about 90 feet to the back end of the building; and the machine worked well with about 8-10ths of pressure. In fact, if there were just pressure enough to overcome the friction in the pipe leading to the engine, the engine itself would work well, sucking, as it were, gas from the main with almost no pressure. He had no fear for gas-engines, and thought that after a while they would become more popular than steam-engines for anything under 15 or 20 horse power.

Mr. FORSTALL wished to add that he had used a gas-engine to take the sting out of the electric light. The keeper of a large saloon who had determined to introduce the electric light came to him and asked as to what he considered the best engine to use, and he succeeded in getting him to use a gas-engine as his motive power. So that gas managers might console themselves with the thought that even if electricity did take away some of their large customers, they might still sell to them gas to produce their electric light. He put the average consumption of gas in these engines at 20 cubic feet per horse power per hour.

Mr. STARR: That would be 80 feet an hour, or 800 feet a day.

Mr. FORSTALL said this was with the engine working at its full power. He had found that where the engine was working at its full power, it would generally explode with every stroke; but when the power was thrown off and the engine was merely in a condition to operate, it would run some 15 strokes before an explosion took place. The work thus was automatic; the consumption of gas was in direct proportion to the amount of work that the engine was doing, up to its full power.

Mr. WEARE inquired why it was there was so much difference between the cost of a gas-engine and a steam-engine. He said he could purchase a steam-engine of, say, 4-horse power, complete, for 350 dols.; but a gas-engine cost about 400 dols.

Mr. HELME said he had thought this matter over a good deal, for he had a lively interest in gas-engines. In the first place, the makers of them had to pay a considerable royalty. Besides there was a large amount of money spent in making experiments, and getting the engine up to its present condition. It was at first imperfect, and a great deal had to be done, and much money had to be spent to bring it to the state it was in now. There was another thing about it. A gas-engine being propelled by explosion required stationary rods and stationary bed-plates perfectly fitted. A steam-engine, on the other hand, receiving the steam slowly, the strain was very much less sudden and severe than in the case of the gas-engine. Therefore, the cost of the gas-engine was largely due to the workmanship required.

The PRESIDENT said it was very difficult to institute a comparison. It was said that a 4-horse power engine could be bought for 350 dols.; but then there must be taken into account the labour, repairs, &c., before the cost could be arrived at. He had heard of an engine and boiler which cost 125 dols., but which proved to be very dear in the end. So it might be that the boiler and engine costing 350 dols. might prove dear in the long run, compared with a gas-engine that cost twice as much.

Mr. RAMSDELL said the cost of the gas-engine was largely owing to the labour upon it, as Mr. Helme had suggested. In the case of the 17-horse power engine, the price was 1385 dols. The cost of the Corliss engine was 1320 dols. without the boiler, or smoke-stack, or any of those things—just the engine alone. So there was only a difference of 65 dols. between the two engines. On the 4-horse power engines the difference in the amount of labour was very little, and the difference in material considerable. Of course, a large engine was heavier in all its parts, to sustain, as had been suggested, the effect of the explosion.

Mr. NEAL said he had waited to hear something in regard to the working of gas-engines in exhauster-houses. It seemed to him that gas managers were very ready to induce others to use these engines, but were not so ready to use them themselves.

Mr. RAMSDELL said the makers of his exhauster told him they did not think it would work steadily with a gas-engine, as there would be no variation to accommodate itself to the exhauster. He, therefore, gave the matter up.

Mr. NEAL said when he had conversed with people about gas-engines he had always recommended them, but was met by the inquiry if he was using them in the works under his charge. He had given the same season that Mr. Ramsdell had, but it did not seem to satisfy them. It reemed to him that, with all the improvements in these engines, some arrangement might be made by which the exhausters could be run with them. He hoped some one would consider the matter, and endeavour to find a method by which it could be done. Gas managers would then have much more influence and success in persuading others to use them. They could say to them that they were operating very successfully at their works, and this would be far more likely to induce people to take them.

Mr. LITTLEHALES said he thought the objection to adopting gas-engines in exhauster-houses was self-evident. As a general rule breeze from coke was valueless when offered for sale; but it became very valuable fuel to the company itself. In his case they used for fuel the small breeze from the coke heap. It would be valueless if offered for sale, but was of great value as fuel on the works. He did not think there would be any practical difficulty in running exhausters with gas-engines, because, although they ran at a fixed speed, a properly adjusted compensator would get over the whole difficulty. It was a practical question, however, of having the fuel on hand. Most gas companies had a large amount of material already on hand that was valuable for fuel, but which, if not used for that purpose, would not be worth a dollar.

Mr. HELME thought there was a mechanical difficulty in the way of making a gas-engine work as satisfactorily as a steam-engine. The want of uniformity of speed was the trouble that must be overcome. The difficulty was to get a varying movement from a fixed speed which would accommodate the exhauster to the amount of gas being made and brought forward.

Mr. LITTLEHALES said the best answer to this argument was that within the last four or five years they had been using quite a number of gas-engines for running exhausters; and he did not think there was any serious practical difficulty in the way of doing so. Of course, if the works were conducted so that a number of retorts were charged at once, and then quite an interval when none were being charged, some trouble might arise; but this would be a defective arrangement in regard to charging, and not a mechanical difficulty in the way of using gas-engines for driving exhausters.

Mr. HELME said he had known of attempts being made to apply gas-engines to the driving of exhausters, and of alterations that had been made in them, so as to obviate the difficulties that had been referred to; but all the information he had upon the subject was to the effect that, even with the improvements that had been introduced, they did not work satisfactorily when applied to exhausters. He did not believe that the mechanical difficulty which he maintained was inherent in the machines was likely to be soon overcome.

Mr. STARR thought the difficulty might be obviated by having a compensator, so that when a large volume of gas came it would close itself automatically.

Mr. HELME said he did not believe that compensators would be found to work satisfactorily on gas-engines that were used to run exhausters.

Mr. RAMSDELL said he had fixed a compensator in place of a governor in the gas-engine used at his works for crushing coke, and he found there was less pulsation in the gauge when the compensator was in use.

The PRESIDENT said he had never met with any more serious objection to the use of gas-engines than the quantity of gas used to actuate them. People seemed afraid of the addition that would be made to their gas bills. So far as his experience went, in advocating the use of gas-engines he had not felt the same difficulty as had been mentioned by others—viz., that they were not used in the gas-works among his own people. He could always point to the fact that their engines and boilers were erected years ago, and they could not afford to throw them on one side, though they recognized the superiority of gas-engines in many respects.

The discussion was then brought to a close.

The proposed alteration in the time of meeting was next taken into consideration, and some considerable discussion ensued on the suggested change of the date of assembly. Eventually, however, on a vote being taken, the Executive Committee's recommendation to amend the constitution was not adopted.

[The subsequent proceedings at the meeting we shall notice in the next volume of the JOURNAL.]

THE GLASGOW EXHIBITION OF LIGHTING AND HEATING APPLIANCES, &c.

It may be remembered that during the recent Exhibition of Lighting and Heating Appliances, &c., held in Glasgow, the Committee of Jurors appointed to examine and report upon the cooking stoves exhibited, and on which an adjudication was requested by the exhibitors, instituted a sort of competition by having no fewer than nine of them subjected to a crucial practical test in the way of roasting a leg of mutton and baking two or more loaves of bread, both of the operations proceeding at the same time. As the stove exhibits were arranged throughout the whole length of the Drill Hall in which the exhibition was held, and along the middle line, the competition excited a great amount of interest amongst the visitors, who were very numerous on the evening when it took place; indeed, many of them seemed to take almost as keen a degree of interest in it as the exhibitors and their attendants. The Committee of Jurors on Cooking Stoves (Section IV.) consisted of Mr. Samuel Stewart, Corporation Gas-Works, Greenock; Mr. George R. Hislop, F.C.S., Corporation Gas-Works, Paisley; Mr. Charles Thornton, Practical Cook and Restaurateur, Glasgow; and Mr. John L. Bruce, I.A., Glasgow. The last-named gentleman enjoys no mean reputation as an expert in connection with heating by gas, and it was therefore natural that he should be selected to act as the Convener of the Jurors in Section IV. Their report recommended that the following awards should be made:—

FIRST—*Certificate of Merit* [Highest Award].—The Argyle Ironmongery Company's "Universal Domestic Cooking Stove;" Mr. Charles Wilson's "Eclipse Gas Kitchener;" Mr. Wright's "Gas Cooker," No. 492, exhibited by Messrs. Andrew Shaw and Son, Glasgow.

SECOND—*Honourable Mention*.—Cox's Patent "Despatch Cooker" and Cox's "Save-All Cooking Stove," per Messrs. J. C. Stark & Co., Torquay; Messrs. Beverley and Wylde's "Leeds Family Kitchener," with white tile linings, per Messrs. J. Gray, Son, and Co., Glasgow; Messrs. Billing's "Sun-Dial Stove" (Reflector), per Messrs. Watt and Son, Glasgow; The Argyle Ironmongery Company's Combination Coal and Gas Range.

In their report, the Committee stated that "generally speaking, the points taken into consideration in making these awards were—1st. The economy in gas burned in proportion to the size and cooking capacity of the stove, together with its heat-conserving power. 2nd. The cooking accommodation and workmanship in proportion to the prime cost. 3rd. The convenience of the management for general domestic purposes."

The Committee concluded their report in these terms: "With regard to one of the stoves submitted—namely, that of Dr. Adams, your jurors desire to express their high approbation of the method of burning the gas as adopted in it, and which has to their belief secured the advantages of the perfect combustion in the atmospheric or Bunsen burner, without its liability to be extinguished by draught, or shock, or to 'strike back' when lowered; together with much more than the radiant energy of the ordinary white flame—thus obtaining what is, in their opinion, the most perfect gas-cooking burner known to them. Your jurors, therefore, think that the burners *by themselves* are well worthy of a Certificate of Merit, but do not consider that they themselves are entitled to separate the *burners* from the *whole apparatus* as entered for adjudication, and to which, in its present primitive form, they do not feel justified in recommending any award. For these reasons they leave it to the General Committee to act in this instance as they may deem it best."

CURRENT SALES OF GAS PRODUCTS.

MANCHESTER, *Dec.* 24, 1880.

Tar continues in demand at about 40s. per ton.
Ammonia liquor (sp. gr. 1·085), 22s. per ton.
" sulphate, white, £19 10s.; grey, £18 10s. per ton.
" muriate, no material change; white, at £35 per ton.
Sulphuric acid (brown vitriol), £2 19s. per ton.
Muriatic acid, £1 5s. to £1 10s. per ton.
Oxide, and sulphur oxide, no transactions to record; value as last quoted.

THE GAS AND WATER SUPPLY OF BURNLEY.

The following particulars in reference to the gas and water supply of Burnley are taken from an interesting article on "Old and New Burnley" in a recent number of the *Preston Guardian*:—

The gas department is the most profitable undertaking in connection with the Corporation. The Burnley Gaslight Company was established in January, 1823, with a subscribed capital of £4500, in 450 shares of £10 each. The erection of the works was immediately afterwards proceeded with, and the town was first lighted with gas in February or March, 1824. Two years subsequently the Company obtained an Act of Parliament by which they were incorporated, and their capital was increased to £7200, in 600 shares of £12 each. In 1845 they obtained the sum of £3800 on mortgages of the works, and their first dividend was paid in 1872. For the first 18 years, the Company made a charge of £2 15s. per lamp, but in 1842 they reduced the price to £2 12s. 6d., in 1849 to £2 7s. 6d., and in 1853 to £2 4s., at which price it remained until the works were sold to the Improvement Commissioners. The prices charged per 1000 cubic feet of gas were as follows:—1824 to 1841, 10s., from which was allowed a discount varying from 5 to 40 per cent.; 1842 to 1844, 8s. 4d. to 5s., according to consumption; 1845, 6s.; 1846, 6s. to 5s., according to consumption; 1847 to 1849, 6s. to 4s. 6d.; 1850 to 1852, 5s. to 4s.; January, 1853, 4s. 6d. to 3s. 6d.; July, 1853, to October, 1854, 3s.; October, 1854, 3s. 6d.; the price of coal at that date being 8s. 6d. per ton. During the period the Company held the works the Shareholders received in dividends on each £12 share the sum of £37 2s. 6d., or an average dividend of £1 6s. 6d., being equal to about 11 per cent. per annum. But, in addition to this, they received back in payment for each £12 share the sum of £36 10s. Thus, each £12 invested returned the Shareholders a total of £73 12s. 6d. The Improvement Commissioners took possession of the works on Jan. 1, 1855, the purchase-money amounting to £30,183 0s. 3d. At that time they were capable of producing 384,000 cubic feet of gas in 24 hours. Since then, by efficient management and judicious and profitable extensions and improvements, the works have been developed until they are now capable of making 1,250,000 cubic feet of gas in 24 hours. The gasholder space has been increased from 310,000 cubic feet in 1855, to 9,400,000 cubic feet in 1880; and, while the largest consumption in any one day in 1855 was 267,000 cubic feet, it has risen in 1880 to a maximum of 1,369,000 cubic feet, while the minimum during the present year has been 120,000 cubic feet. In 1855 there were 1608 consumers, as compared with 8470 at the present time. The gasholder capacity is distributed as follows:—No. 1 gasholder, 120,000 cubic feet; Nos. 2 and 3, each 208,000 cubic feet; No. 4, 438,000 cubic feet; or a total of 994,000 cubic feet. During the past few months one of West's patent stokers has been introduced, and is working very satisfactorily, causing a material saving in the time occupied in charging the retorts. Other improvements have been effected, and altogether the manner in which these works are managed by Mr. S. P. Leather, and a Committee of which Alderman Coultate is the Chairman, is productive of a very handsome yearly surplus, which is devoted to the reduction of the rates, notwithstanding that the gas is sold at 2s. 9d. per 1000 feet, with 3d. per 1000 feet discount if paid within three weeks. This year it is estimated that the surplus will be an exceedingly large one, so large, indeed, that some sanguine authorities place it at £8000! There are 871 public lamps in the town.

In reference to the water-works the article continues:

No department connected with the Corporation is just now exciting more attention than that of the water-works, from the fact that the scheme matured by the present Manager, Mr. J. Emmett, has recently been deemed inadequate by Mr. S. J. Smith, C.E., who was sent down by the Local Government Board on the 20th of October last to inquire into the nature of the project. At present there is gathering-ground 1000 acres in extent, and the storeage capacity of the respective reservoirs is as follows:—Lea Green, for compensation to millowners, 22 million gallons; No. 2 reservoir, for the use of the town, 32 million gallons; No. 1, also for town use, 150 million gallons—total capacity of the three reservoirs, 204 million gallons. Besides these there is a reservoir at Heckenhurst, constructed to hold 20 million gallons. About two years ago this was emptied in consequence of a leakage. It is, however, believed that it can be made watertight, and it has been mooted that this should be done, and that a proposal should be made to certain parties to whom compensation water has to be given, in order that more water may be impounded into the existing reservoir, thus staving off, for a few years at least, the construction of a new one. The average daily supply from the brooks and springs is 150,000 gallons, and the average daily compensation to millowners on the stream, calculated for 311 working days at 2 cubic feet per second, is 460,109 gallons. On the 30th of September last the number of houses supplied with water, both inside and outside the borough, was 12,203, and the population, computed at 5¼ persons per house, was 64,045 persons, while the quantity of water consumed on an average by meter last quarter was 101,000,888 gallons. The water-works were first commenced by a Company, which was established by Act of Parliament in 1819, and the whole undertaking passed into the hands of the Improvement Commissioners under the provisions of the Burnley Improvement Act, 1846, the amount paid for them being £11,500. As showing the remarkable rate of progress which the town has made during the past quarter of a century, it may be stated that in 1855 there were 4510 consumers, whereas during the present year the number of those supplied with water by the Corporation is no fewer than 12,387, thus showing that during this time the population has nearly trebled. By Mr. Emmett's scheme, it was proposed to construct a reservoir in the Swindon Valley, in which the existing works are situated, and to connect it with the Thurston Valley, on the other side of the hill, by means of a tunnel, so as to convey the water from the latter into the former valley. The gathering-ground in the Thurston Valley is 1000 acres, and that in the Swindon Valley (above the embankment of the contemplated reservoir) 475 acres. The proposed tunnel would have had a fall of 5 feet per mile, and would have been 5 feet in its internal diameter, so as to take, when running full for about 24 hours, 36,471,600 gallons, and the embankment was to have been 100 feet high. The total cost was estimated at about £80,000. The ground upon which the scheme was disapproved by the Inspector was that it was proposed to take the pipes through the embankment, which Mr. Smith said was extremely dangerous, as that plan had been tried at Holmfirth and one or two other places, where it had completely failed, the pipes having burst, causing the embankment to give way, and a general flood ensuing. He suggested that a new pipe line should be constructed along the site of the reservoir, and that the embankment should be no higher than 60 feet. But inasmuch as the cost would be so great in proportion to the extra number of gallons that this would give, it is probable that the plan will not be adopted.

NOTES FROM SCOTLAND.

(FROM OUR EDINBURGH CORRESPONDENT.)

EDINBURGH, *Monday.*

Mr. Boyd Miller M'Crae, for many years the able and energetic Manager of the Corporation Gas-Works at Dundee, died at his residence in that town, on Friday, the 24th instant, after a protracted illness. Mr. M'Crae had not been in his ordinary state of health for a considerable period, and, consequently, he had been unable to devote that time and attention to his official duties which in the past had earned for him the high esteem of the Corporation of Dundee. Two or three months ago Mr. M'Crae was prostrated by an attack of rheumatic fever, from the effects of which he never recovered, although fatal results were not anticipated until quite recently. Mr. M'Crae came to Dundee from Airdrie in the year 1867. At that time gas was supplied to the town by a private Company, and when, a year later, the works were acquired by the Corporation, Mr. M'Crae was elected to the position of Manager. Since his appointment the Corporation have had every reason to be satisfied with the services of their Manager. He devised and carried out in the gas-works many improvements which have resulted to the general advantage of the consumers. He did much to promote the interests of gas generally by untiring efforts to show to his constituents, and through them to the country at large, the best and most economical modes of consuming gas; while his thorough mastery of all the details of gas manufacture, and his intimate knowledge of the value of plant, &c., caused his services to be greatly sought after by other companies and corporations when works were about to be transferred. Mr M'Crae was a member of the North British Association of Gas Managers, but in latter years he did not take such an active part as formerly in its annual meetings. I think the last meeting of the kind that he attended was in St. Andrew's, in July, 1878, when Mr. Hall, of that city, occupied the presidential chair. On that occasion he crossed swords with Mr. Young, of Clippens, on the question of determining the value of gas by durability rather than by volume; but since then, so far as I am aware, he had not taken any share in the discussion of the various and important questions which subsequently came before the Association. Mr. M'Crae had great decision of character. What he resolved upon he executed with promptitude and despatch, and sometimes it was thought that he paid less respect to the opinions of others than he ought to have done. This, however, was the natural result of an exceedingly active mind, and was not the outcome of any feeling of disrespect. There can be no doubt that, in the death of Mr. M'Crae, Dundee has lost a thoroughly qualified and diligent public servant; and gas managers generally, an ornament of the profession. It may be mentioned that one of Mr. M'Crae's sons is Manager of the Bury St. Edmund's Gas-Works.

Any one reading the published reports of the proceedings of the Town Council and of a special meeting of the Gas Company of Jedburgh must be driven to the conclusion that the reputation of that ancient burgh has been lost irretrievably. The Town Council, or some of its members, are anxious to acquire the gas-works, and the Directors and some of the Shareholders of the Gas Company are desirous to improve the works under their control, so as to enable them the better to meet a prospective increase in the consumption of gas. In either of these proposals there does not seem to be anything out of the ordinary run of events, except in one respect—that the present inhabitants are acting quite inconsistently with all their historical associations. The present generation are happily not familiar with the application of "Jeddart justice." To hang a man, and then to try him for the crime laid to his charge, is the fundamental principle of the justice that was meted out in Jedburgh in the good old times, and in strict accordance with this principle, the Town Council ought first to have taken possession of the gas-works, and then to have considered whether anything, and, if anything, how much ought to be paid therefor. In the same way the Directors, instead of consulting the Shareholders as to the desirableness of making such alterations and additions as would prevent the works from becoming a total wreck, ought to have proceeded, and presented the bill for the outlay at some subsequent ordinary meeting of the Proprietors. But neither of the parties adopted either of these courses, and a good deal of popular interest in the result has been withdrawn from the proceedings. They have, however, an interest, though it may be somewhat technical. At the last meeting of the Town Council, fully a fortnight ago, Bailie Craw made a little speech, the object of which was to prepare the minds of his fellow-councillors, as well as of his townsmen, for the motion which he means to make next November, that the town acquire the gas-works. The Bailie holds the opinion that the gas supply of a town ought not to be in the hands of private speculators, but that such works ought to be held by the Police Commissioners, whose duty it is to give the community cheap gas. This is a view which is now pretty generally advanced when the acquirement of gas-works is in question, and one might reasonably ask, "Whence all this new-born zeal?" But for private speculation, how many towns in Scotland, even at the present moment, would be without a gas supply? and, because the speculation turns out a success, the rule is laid down that the works ought to be under the control of the community who consume the gas. Of course, as the Legislature has sanctioned such proceedings, the subject is beyond the influence of argument; but there was one little indication in the Bailie's speech, which, had it not been somewhat qualified by his remarks three days later at the meeting of the Gas Company's Shareholders, would certainly lead to the conclusion that this early notice of motion was to prevent the Company meanwhile from proceeding with their alterations and repairs, and thus to enable the town to obtain possession of the works at a reduced figure. He pointed out that under the Burghs (Scotland) Gas Supply Act such a motion as he means to propose can only be brought up in the month of November; but that the present was the proper time in one view of the matter, because the gas-works were expected to be put under repair, which would cost a good deal of money. This was said at the Town Council meeting on Monday, and on Wednesday at the Gas Company's meeting he warned the Directors that the putting of their works in order would not affect their transference to the town. It does not appear that the Bailie is the exponent of the views of the Town Council or of the remainder of the inhabitants of the town, yet he speaks of the future event with all the confidence of Dean of Guild Scott, of Montrose. At this meeting of Shareholders the proceedings were of a somewhat lively description. The Chairman (Mr. James Cumming, banker) mentioned that the Directors had unanimously recommended that 250 new shares should be issued at par, which should first be allocated among the Shareholders in certain proportions, and to the public afterwards. They further recommended that, in the circumstances, they should be authorized to sign bonds or bills to raise any money which might be required for the proposed alterations. He pointed out that within the past 14 years the demand for gas had nearly doubled, and that the works in their present condition were quite incapable of meeting the prospective increased demand. He also mentioned that some of the recommendations now made had been

proposed 18 years ago. A point was raised by Mr. John Laidlaw which revealed rather a peculiar state of affairs. Despite the knowledge that the works were in a sad state of disrepair, the Company at one time, when they had £500 or £600 to dispose of, increased the nominal value of the shares from £5 to £6, and now the Company propose to issue additional shares at par to execute the repairs which had been proved to be necessary in former years. This division of surplus funds may be right enough, but in the present knowledge of facts it sounds strange. Ultimately the meeting approved of the recommendations of the Directors, *minus* that relating to borrowing.

The gas-works at Forfar seem to be in a flourishing condition. At the meeting of the Gas Commission on the evening of the 20th inst., the Manager (Mr. Esplin) reported that the gas manufactured during the past month amounted to 4,603,800 cubic feet, as against 3,978,200 for the same period last year, being an increase of 625,600 cubic feet.

It is peculiar, but it is nevertheless consistent with fact, that at Dumbarton, where neither effort nor expense is being spared to introduce the electric light into the engine and boiler sheds of a large ship-building firm, the consumption of gas is steadily on the increase. To a certain extent this may be accounted for by the multiplicity of cooking and heating stoves in the town, and the balance of increase may be due to the natural increase in the number of consumers. I may mention that this is not the first time that Messrs. Denny have brought the electric light into requisition, and it is quite within the range of possibility that they may soon again revert to the old condition of affairs. One of the aims which the firm have in view is to get a powerful light and in such a position that it will be protected from the attacks of the rough, thoughtless class of boys usually employed at such works; but it may be pointed out that a chip of iron will break a carbon pencil, or injure the delicate machinery for regulating the electric current, quite as readily as the glass surrounding of a gas lamp, whilst in the latter event the loss arising from stoppage of machinery, which would inevitably follow the extinction of the electric light, would be infinitesimal. It is an open secret that one member of the firm on a former occasion lost the bet of a new hat that the then introduction of the electric light would be permanent; but it has not transpired whether he is willing to repeat his speculation.

In the local prints there have been many complaints, during the past year or two, both with respect to the quality of the gas and the water supplied to the town of Banff, and now the Police Commissioners of the town are determined to take action. A Committee has been appointed to consider whether, under their Act, the Commissioners have power to deal with or take over the works of private the Companies. In moving the appointment of this Committee, the Provost said the inadequacy of the water supply and the condition of the gas had long been felt by the inhabitants as subjects requiring attention.

The town of Whithorn, in Wigtownshire, has been the scene of a good deal of wrangling in connection with the water supply. The Local Authority proposed to sink additional wells in order to afford the necessary quantity for the inhabitants; but the Board of Supervision, which is supreme in these matters, say they cannot express any opinion as to whether the proposed wells would be sufficient in quantity and quality for the burgh. Then follows this important statement:—The Board consider a constant daily supply of not less than 15 gallons per head of the population not too much for domestic use and sanitary purposes. The Board's experience as to quality has been that money spent in sinking wells in or near houses is thrown away, because the water, though pure at first, does not long remain so. If the Local Authority persist in obtaining a supply from wells, it will be the Board's duty afterwards to ascertain whether the quantity and quality are sufficient. The Board again recommend the Local Authority to obtain information as to a gravitation scheme from a competent engineer, and until they have done so they cannot accept the allegation that such a scheme is impracticable. In view of this statement, the Local Authority have resolved to call a meeting of the ratepayers to consider the question.

The Town Council of Galashiels have resolved to borrow £10,000 from the Public Works Loan Commissioners, to meet the extra cost of the water-works.

GLASGOW, *Monday*.

I understand that there is every prospect of an effort being made at an early meeting of the Town Council of Glasgow, to overturn or counteract the resolution recently arrived at regarding the spending of the sum of £5000 from the past year's gas surplus in the way then mentioned. Since that resolution was passed a feeling has arisen outside—and has found expression at two meetings of Municipal Ward Committees—that all profits made by the sale of gas should be devoted to the reduction of the price of that commodity. If the effort to which I refer be made, it will doubtless come from a gentleman who is at present outside the Town Council, but who, at the first meeting of that body, will be elected to fill a vacancy now existing, and which was lately caused by the lamented death of ex-Bailie Moir, a gentleman who was long an active and useful member of the Corporation Gas Committee. There is a great probability that the principle involved in the amendment, which had only six supporters at the last meeting of the Town Council, will have found a larger number of supporters when the question is again brought forward for consideration.

It is scarcely within my province to give any detailed notice of the professional career and status of Mr. B. M. M'Crae, the well-known Gas Manager at Dundee, whose death has just been announced; but having known him when he occupied the much humbler position of Gas Manager at Airdrie, I may be permitted to say a word or two, by way of indicating the great degree of respect which was entertained for him by his many friends and professional brethren in the West Country. He certainly stood high in the ranks of gas managers and engineers in Scotland, as evidence of which he was a number of times in recent years called to the West and South-West of Scotland to assist in arbitration cases, and otherwise to give professional advice in connection with gas-supply undertakings. He bulked so prominently in Scotch gas affairs that, for a time at least, there will be a gap left by his lamented death.

Mr. W. Arnot, F.C.S., Public Analyst of Edinburgh, has just reported regarding the quality of the gas supplied to the town of Galashiels, which is, he says, of good quality, having an illuminating power of 29·9 standard candles, being free from sulphur compounds, and containing only traces of ammonia. This is certainly a good character to give a gas supply which is claimed to be the cheapest in Scotland.

The Directors of the Hawick Gaslight Company have lost no time in carrying out the resolution of the special meeting held last Monday week regarding the acquisition of ground on a more convenient site for their gas-works. On Thursday last they feued, by public auction, two plots of ground at Wilton Glebe, belonging to the Burgh Authorities, one of them consisting of 4¾ acres, which they secured at £25 per acre per annum, and a smaller one at the rate of £40 per acre.

Some time ago a powerful Sugg street-lamp was purchased by the Paisley Municipal Authorities. It has now been erected about the centre of County Square, which is certainly the most public place in the town. It was lighted for the first time on Friday night, when it considerably eclipsed the ordinary lamps which fringe the causeway all round the square. Mr. Sharp, Master of Works, has designed a very suitable protection for the lamp-pillar, consisting of dwarfed octagonal granite pillars to form the angles of the square, which is enclosed by a pretty ornamental balustrading. The lamp, standing fully 18 feet high, was much admired by the townspeople, who are already urging the propriety of having another lamp of the same kind erected at the Cross.

It is evident that some people who "go in" for electric lighting are rather difficult to please, for I have lately heard of no fewer than three firms who had adopted the Siemens system in their several establishments turning out the apparatus, and substituting the Gramme dynamo-electric machine and Crompton lamps. Some appearance of truth is given to the statement by an advertisement in one of the leading daily papers of a lot of Siemens apparatus being for sale, even down to a "quantity of carbon points." It goes on to state that—"If wanted, a trial can be given before purchasing;" but the advertisement would be more complete if it had stated why the previous owner or owners had deemed it proper to give up using it.

At the last meeting of the Police Commissioners of the Burgh of Wishaw a report was submitted by Mr. Tait, the Burgh Engineer, which stated that the outlay in connection with the water supply up to date was £12,000, which, with upkeep and repayment of money borrowed for works, it was calculated would cause an annual charge of £840. The consumption was taken at 102 million gallons per annum, of which 72 millions was consumed within, and 30 millions outside the burgh. The cost per million gallons was, therefore, £8 5s. It was also stated in the report that the outlying parts were only paying £185, and that the burgh ratepayers contributed £655 towards the total income.

On the 11th inst. the amount of water in store in the Greenock reservoirs was 285,485,643 cubic feet, being equal to a supply for 81 days for all purposes. This was less than the supply in store at the same date last year, but quite sufficient to remove all fear as to a scarcity.

Prestwich, a rising suburb of Ayr, is much exercised over the water question. A proposal to form a special water district has just been defeated by a majority of ratepayers attending a public meeting held to consider the subject.

A fair amount of business has been done in the Glasgow pig iron warrant market since last report, and Friday's closing prices were for sellers, 51s. 8d. cash and 51s. 10d. one month, and buyers near.

There is practically no change to report in the condition of the Glasgow coal trade. The demand will for some days be lessened on account of the holiday festivities.

THE LANCASHIRE COAL AND IRON TRADES IN 1880.

(FROM OUR OWN CORRESPONDENT.)

In neither the coal nor the iron trade of this district can the results of the operations of the year now closing be considered satisfactory. In the coal trade particularly business has been carried on under most discouraging circumstances, and in many cases at considerable loss to the proprietors of collieries. The year opened with anticipations of improved trade, and prices, which had gone up slightly at the close of 1879, still exhibited an upward tendency. Best Wigan Arley was in some cases quoted at 9s. 6d.; common qualities, 7s. to 7s. 6d.; Pemberton four-feet, 6s. 9d. to 7s. 6d.; common round coal, 6s. to 6s. 6d. This state of things was, however, of very short duration. The demand rapidly fell off, whilst the market was burdened with an increased production of coal, which had been stimulated by the prospects of better trade; and large surplus stocks being pressed for sale, prices were forced down to a lower point than had been known in the trade for many years past, common coal being offered as low as 4s. 6d. per ton at the pit's mouth, and best Wigan Arley at from 7s. 6d. to 8s. Trade continued in an extremely depressed condition all through the summer, and, in the majority of cases, the pits were not kept going more than about half time. Perhaps nothing could more strikingly illustrate the thoroughly discouraging condition of trade than the character of the competition for the gas coal contracts given out during the summer months, sellers, in their anxiety to secure an outlet for their coal, tendering for deliveries over five years, and some of the largest consumers in the district actually restricted their selections to tenders for not less than three years. And not only was coal offered for these extended periods, but prices in some cases were below those at which gas coal had ever been known to be offered before, good screened Wigan district gas coal being readily obtainable at from 5s. 6d. to 6s. per ton. During the last couple of weeks there has been a slight improvement in trade, owing to the winter demand for house-fire coals, and this has enabled colliery proprietors to obtain an advance of about 1s. per ton on coal, best Wigan Arley at the pit now averaging about 9s., common qualities and Pemberton four-feet, 7s. to 7s. 6d., and common Wigan mines about 5s. 6d. to 6s. per ton. Engine classes of fuel have not shown much fluctuation during the year, and have averaged about 4s. to 4s. 6d. for Wigan, and 3s. to 3s. 6d. for good slack at the pit.

In the iron trade the improved movement in prices which commenced in the autumn of 1879 continued during the first month or six weeks of the new year, and local makers of pig iron had during February advanced their quotations for delivery into the Manchester district up to 72s. 6d. per ton, less 2½ per cent. The demand for iron, however, now began to fall off, makers were unable to realize their last advance, and in April came the complete collapse of the speculative operations for shipment, which had forced up the market. Large quantities of iron which had been bought on speculation were thrown upon the home market, and there was a rapid fall in local pig iron of about 7s. 6d. per ton, which was followed by a continued downward movement in prices, which in the course of about three months represented a total drop of about 25s. per ton. This was followed by a fair amount of buying, and slight recovery of prices; then another relapse, which left trade in as depressed a condition as at any time during the previous year, and some sales of local forge iron were made at as low as 45s. per ton, less 2½ per cent. During the last couple of months a considerable amount of buying has been going on, and prices have crept up to 46s. 6d. and 47s. 6d., less 2½ per cent. delivered in Manchester, at which they are now firm, and with the close of the year there appears to be a healthy prospect for the future. Finished iron has followed much the same course as the raw material, and bars, which got up to £9 to £9 10s. per ton in February are now offered at £5 15s. to £6 per ton, with but little demand in the market.

In the engineering branches of trade there has been an absence of any general activity, but many of the principal firms have been well supplied with foreign work, and there has been a gradual improvement going on, the number of men out of employment in the district being considerably less at the close than at the commencement of the year. The great complaint all through, however, has been that the prices at which orders have been secured have been extremely low.

At the close of the year the wages question is beginning to agitate trade, and in the coal-mining industry there is every probability of strikes in several districts for an advance of wages.

THE YORKSHIRE COAL AND IRON TRADES IN 1880.

(FROM OUR OWN CORRESPONDENT.)

Taken as a whole, the year which is just passing away has been anything but a prosperous one for coalowners, while miners for many months worked short time, and were compelled to submit to reductions of wages. Unfortunately the labour market, especially in South Yorkshire, has been in an unsettled state. Strikes, lock-outs, and disputes have been of frequent occurrence, rendering trade exceedingly difficult to carry on; inasmuch so that coalowners scarcely dare enter into lengthy contracts. The proposed sliding scale fell through, owing to the owners and the men being unable to agree upon a basis; but in West Yorkshire the desired end was attained. Hence disputes have not been nearly so frequent as they were a short time ago.

The general aspect of the house coal trade for about nine months of the year was very quiet, while prices ranged so low that many collieries were worked at a serious loss, and as the year closes some are in course of being wound up, whilst others are set down, much to the discomfort of disappointed shareholders. The London trade, which forms so important a part of the business done in South Yorkshire, and at several collieries in the West Riding, has been generally very quiet over the twelve months. In the first month of the year the Great Northern Railway Company conveyed only about half the tonnage usually carried over that line from the Silkstone pits. As the year wore on this did not improve, for neither the demand for Silkstones nor that for Barnsley thick-seam coal materially increased until the month of October, when the returns showed that eight Silkstone collieries, which sent about 11,000 tons in January, forwarded 15,000 tons in October, and 17,800 tons in the following month. The demand for house coal for the Eastern Counties and for Lincolnshire was very moderate indeed for nearly three-quarters of the year.

The gas coal trade seems of late years to have become extended in the county, where several qualities of coal suitable for gas-making purposes are won. As is generally the case, most of the coal required is supplied on contract. Although it is not known in all cases what the contracts were placed at, it may be stated that some of the companies had scarcely ever a larger number of tenders to select from, whilst prices were certainly low. Amongst the gas undertakings which favoured South Yorkshire with part of their orders were the Nottingham, Derby, Grimsby, Stamford, and others in the Midlands, in addition to which a good tonnage was sent to the Eastern Counties. The Nottingham Corporation placed 68,000 out of the 100,000 tons required with eight South Yorkshire colliery firms. Some of the works have resorted to the use of Silkstone, in preference to the thick-seam coal.

Although prices have ranged very low throughout the year, the steam coal trade has been very fair. During the export season a large tonnage was sent to Hull by both rail and water. Grimsby shipped a heavy tonnage from South Yorkshire, and Goole and Hull from the West Riding pits. When the contracts were placed early in May, the keenest competition ensued, so that great changes took place with regard to the distribution of the orders. The result was that some of the thick-seam pits worked very fair time, whilst others did not make more than three or four days per week.

Other kinds of fuel have varied a good deal at certain periods of the year, but throughout the whole period supplies have not only been plentiful, but prices have ruled low. The West Riding pits have done a fair business in slack and small coal for engine purposes. During the early part of the year this kind of fuel was bad to dispose of in South Yorkshire, but, owing to the large output of coke, the difficulty was considerably lessened. In no former year since coal has been worked in Yorkshire has there been such a vast outlay in machinery for grinding, crushing, and washing slack for coke-making purposes. At many collieries from £8000 to £10,000 has been expended on new ovens and machinery of the class referred to. In this way the coke has been materially improved in quality, and now commands a good sale in the North Lincolnshire and other iron-smelting districts. As the year closes, however, the trade, which has generally speaking been good, is on the wane, and prices are lower, whilst stocks are accumulating.

The finished iron trade has, with few exceptions, been quiet, and prices at times have varied a good deal. The make of pig iron has been about a uniform one throughout the year. There have been very few changes in the number of furnaces in blast, and in the importation of ironstone from North Lincolnshire, which is now largely used throughout both South and West Yorkshire. The general foundries have been rather badly off for orders, and at most places only a limited number of hands have been employed. At the Thorncliffe Works, and one or two other places where gas and water requisites are produced, business has been very fair. Plates and merchant iron have not been over largely produced, but with the exception of short intervals the demand for Bessemer steel rails, tires, and axles has kept up very well.

THE COAL AND GENERAL TRADES OF THE NORTH OF ENGLAND IN 1880.

(FROM OUR OWN CORRESPONDENT.)

The year which is now drawing to a close has been a good one for the working classes in this district, as they have been more regularly employed than for three years previously. Wages have not advanced in any trade, and there is not much prospect that they will do so to any great extent in the forthcoming year. The present year has not, however, been a profitable one to the capitalists. At the same time the absolute loss which characterized a great deal of the business of the previous year has been avoided. Most large concerns which in the last-mentioned period showed very considerable losses in the balance-sheets issued by them, have made their loss into a gain, and in several instances have been able to give their shareholders a dividend of 5 per cent.

The chemical manufacturers took pretty extensive orders in the early part of last year; but very many—indeed, most of them—were of a speculative description. The middle men have had to take the chemicals over, and find a market for them as best they could. They have had to stand the loss; and as most of them were wealthy concerns, the losses to the manufacturers have not been numerous. At the same time there have been some awkward failures amongst some manufacturers and merchants at Newcastle over the past three months, through a shipping house, which had been concerned in speculation in chemicals, fire-clay goods, coke, and coals, becoming bankrupt.

The gas coal trade of the county of Durham was again very active last week, and the shipments were heavy. The contracting for next year has commenced, and in some instances for the highest qualities an advance of something like 3½d. or 5½d. per ton has been established, but generally speaking there is very little alteration in rates, from last winter's business. The leading collieries in the trade are in some instances unable to take any more steamers on to load until the second week in January, their books being quite full of orders until that time. Second-class and medium sorts of gas coal command a very excellent market just now, but, as a rule, very few new contracts are entered upon for a longer period than twelve months. The house collieries are doing a very satisfactory business for present shipment; the demand, however, is not excessive. There is an improvement in the value of steam coals, the local business done in manufacturing coals and coke and coking coals is very steady, and in the southern division of Durham somewhat better prices are realized.

There was rather a large arrival of sailing vessels in the coal ports last week. Most of the gas ships had been taken on to load before they arrived, so there was no great amount of sailing tonnage disengaged in the open market. Sailing ship freights did not alter from last quotations, but the steamers on offer being in excess of the requirements of trade, rates for them were lower. The quotation was 4s. 1½d. per ton London, with other ports in proportion.

The chemical markets in the north-eastern towns have not shown much alteration upon previous quotations. Soda was scarce, alkali was weak, but other chemicals were unchanged in value. The fire-brick and other trades are looking to an improvement in prices at the beginning of the year, especially for second-class sorts; the makers are trying to regulate their stock-making with that intent. At present the markets in the North of England are entirely void of speculation. The goods sold, whatever they are, go direct into consumption. In this particular the prospects of 1881 are very much better than were those of 1880, which, from the beginning to the end, has had to suffer from the effects of over-speculation, carried on to a very large extent in the early months of that year and the last three months of 1879.

The prospects of the finished iron trade for 1881, if they are not remarkably roseate, have a good sound appearance. The business on hand, say, in iron shipbuilding and in the manufacture of marine engines, is specially active, and if no more orders were coming than the establishments have on their books, they would keep them fully employed until next Midsummer. Recent business shows a rise in values of from 10 to 15 per cent. upon the contracts made in May last for iron ships.

THE SOUTH STAFFORDSHIRE COAL AND IRON TRADES OF 1880.

(FROM OUR OWN CORRESPONDENT.)

The year which is just closing has been somewhat a remarkable one in so far as the iron and coal industries are concerned. Though not in all respects a very prosperous one, yet, as compared with the three preceding years, it bears a favourable comparison. Similar to the close of 1879, the close of 1880 leaves a cheerful ray of hope for future prospects in the coming year; though scarcely so flattering, yet indicative of a steady growing improvement.

Twelve months ago the coal trade was of a buoyant nature, chiefly owing to the increased demand for smelting consumption, and rates were considered to be showing an upward movement. The iron trade had apparently taken a substantial stride towards a prosperous career. The markets were brisk, prices were on the increase, and there was a marked alteration for the better in the export trade. Orders on American account were numerous and of a surprising nature, so much so that it was confidently expected that the great consuming market which had been looked upon as lost, was about to re-establish itself as an extensive field for the South Staffordshire productions. Furnaces were re-lit in all parts of the district, and the number in blast was raised from 25 to three times this figure. The commencement of the year saw the standard rates of marked bars fixed at £8 10s., which was a point higher than had been reached since the memorable prosperous season that closed in 1877. Following the increase of prices in raw and finished iron, agitation on the part of the miners was made for an increase of a penny per day for each shilling advance in the price of coal. The improvement was, however, of short duration, and before the first half of the spring quarter was out a check was experienced. During the last half of the quarter the lull continued, and on the approach of March followed a falling-off in the demand for both household and ironmaking fuel. The system of unduly forcing up prices and purchasing on the part of over-speculators both for a time ceased, and it became evident that a relaxation in rates would result. The demand upon the American account fell off even more suddenly than it sprang up, and with it simultaneously was witnessed a slackening in the demand both for household and furnace coal. At the April quarterly meeting of the ironmasters a further reduction in the price of marked bars was made, leaving the figures 20s. less than they were in the month of February. The number of furnaces in blast dwindled down to 60, and the output, which at the commencement of the year could scarcely have been less than 10,000 tons per week, was not more than 70,000 at the commencement of May. Throughout the summer months the downward tendency continued, and the markets were overstocked by speculators, who were eager to sell, and who in numbers of cases sustained losses of 40 and 50 per cent. Unmarked bars of excellent quality were freely offered at £6 10s. and £6 15s., whilst pig was unsaleable at greatly reduced rates. The great and depressing reaction reached its worst point in July. Speculators having ridded themselves of their bad bargains, and coupled with the diminution in the output, and cessation from activity on the part of many of the mills and forges, stocks had grown less, and a better starting-point arrived. August brought signs of improvement. Mills and forges were set running again, and prices slightly advanced, whilst the markets became brisker and more active. Gradually and surely an improvement became apparent; orders came to hand more freely from Australia, India, and other of the foreign markets, and America has since also been a purchaser to a fair extent for all kinds of finished iron. Best marked bars grew firm at £8, and unbranded sorts became in good request at £7 and £7 5s. Hoops, strips, boiler plates, and nail rods were more actively sought for, and galvanized iron for the Australian and South American markets were in good request. During the closing quarter it may be said that in both the coal and iron trades a steady progressive market has existed, and which continues to look of a hopeful and healthy character, and therefore it may be expected the more lasting and certain.

SALE OF SHARES IN THE DERBY GAS COMPANY.—On Tuesday last, Messrs. Oliver, Newbold, and Oliver sold by auction, at Derby, some shares in the Derby Gas Company, which realized the following prices:—Four £25 shares, entitled to a dividend of 10 per cent., £52 10s. per share; 20 £25 shares, 7 per cent. dividend, £35 15s. per share; 12 £12 10s. shares (£6 5s. paid), entitled to 7 per cent. dividend, £9 17s. 6d. per share; 12 similar shares, £9 15s. per share. The total amount realized by the sale was £1160 10s.

THE PROPOSED PURCHASE OF THE CLAY CROSS WATER-WORKS BY THE LOCAL BOARD.—It may be remembered that a short time since (see *ante*, p. 779) the question of purchasing the Clay Cross Water-Works from the private Company supplying the district was under the consideration of the Local Board, with the result that an offer of £12,000 was made for the works. This having been refused, an application was made to the Local Government Board with reference to the granting by them of compulsory powers of purchase. The Board having replied that such powers could not be granted, a deputation was appointed to meet the Directors of the Company, and inquire whether the Shareholders would really be agreeable to part with their undertaking. The deputation recently had an interview with the Directors, who informed them that if they could

recommend the Local Board to offer the sum of £15,000, the Directors would advise the Shareholders to accept this sum for the works. Mr. Clark, the Chairman of the Directors, said the present was a very unfavourable time to purchase the works, and recommended delay. The matter came again before the Local Board at their last meeting, when Mr. Dickinson, one of the deputation, said he could not recommend the Board to offer the sum asked, and it was ultimately agreed to postpone the question for twelve months.

Opening of New Works of the East Grinstead Gas and Water Company.—On Tuesday last a numerous party assembled at the new works of the above Company, which have been in course of construction for the past two years, to celebrate their completion. After inspecting the buildings, plant, and machinery, which are of the usual character, and have been carried out under the direction of the Company's Engineer (Mr. E. Easton), the party dined together at the Crown Hotel, under the presidency of Mr. W. V. K. Stenning, Chairman of the Company. The Rev. D. Y. Blakiston proposed "Success to the East Grinstead Gas and Water Company," and in doing so gave some particulars in connection with the formation of the Company. The Chairman, in response, referred to the difficulties the Company had had to encounter in connection with their operations, but said he was gratified at being able to state that now, thanks to Mr. Easton, they were in a position to supply water to any applicants at a reasonable price. The fact of a supply of good water being brought close to the door of every house must add considerably to the value of property in the parish, for which the inhabitants were indebted to the Gas and Water Company. They had been able to realize all their money—£14,000—which they wished, with the exception of a few shares, to be taken up by people in the place. At present the Company did not expect to earn any great dividends, but in ten years time they had no doubt of their prospects in this respect. Other toasts followed, and the proceedings terminated.

Extension of the Gas-Works at the Royal Arsenal, Woolwich.—There have just been completed some extensive additions and alterations to the works supplying the Royal Arsenal at Woolwich with gas. Included in the contract for the new plant, which comprised manufacturing plant, purifiers, steam pumps, &c., was a large holder. The work was in progress for nearly a year, and was completed a week or two ago, when the new apparatus was taken into use and the large holder filled with gas. So rapidly have these gas-works grown since their first establishment some years ago, owing to the great success which has attended them commercially, that whereas there were but two holders when the works were first erected, there are now five, the other parts of the establishment having grown in the same proportion. At the present time these works, which are the largest in the Government service, are making and supplying more than five times the quantity of gas they did a few years ago. It will thus be seen that, so far as the War Department is concerned, lighting by gas is likely to obtain for some time to come, there not being any prospect of the adoption of the electric light for general use, either for the great national workshops or other Government buildings, unless in some special case where other and more important considerations outweigh the matter of cost. These recent additions to the Government gas-works have been carried out by Messrs. Samuel Cutler and Sons, of Millwall, from designs prepared by Mr. J. C. Hay, C.E., the Inspector of Machinery and Superintendent of Gas-Works to the War Department, under whose immediate supervision and that of Mr. J. Wallace, the Manager, the whole has been brought to a successful termination.

Institution of Civil Engineers.—The annual general meeting of the Institution was held last Tuesday—Mr. W. H. Barlow, F.R.S., the President, in the chair. A lengthy report by the Council, on the operations and finances of the Institution during the past year, was adopted; after which the premiums and prizes awarded at the close of the last session were presented by the President, to whom the thanks of the meeting were unanimously voted, the services of the Vice-Presidents and Council, and of the Auditors, being similarly acknowledged. The Scrutineers then reported that the following gentlemen had been duly elected to fill the several offices in the Council for the ensuing year:—Mr. James Abernethy, President; Sir W. G. Armstrong C.B., F.R.S., Sir J. W. Bazalgette, C.B., Mr. F. J. Bramwell, F.R.S., and Mr. J. Brunlees, Vice-Presidents; Mr. G. Berkley, Mr. G. B. Bruce, Sir John Coode, Mr. E. A. Cowper, Mr. A. Giles, Sir Charles A. Hartley, Mr. H. Hayter, Dr. W. Pole, F.R.S., Mr. R. Rawlinson, C.B., Mr. A. M. Rendel, Dr. C. W. Siemens, F.R.S., Mr. D. Stevenson, Sir W. Thomson, F.R.S., Sir Jos. Whitworth, Bart., F.R.S., and Mr. E. Woods, other Members of Council. The announcement for the next meeting was as follows:—Tuesday, Jan. 11, 1881, at 8 p.m.: Address by Mr. Abernethy, President, and Monthly Ballot for Members. At the previous meeting of the Institution it was announced that the Council had recently transferred Mr. H. Tomlison to the class of members; and that the first monthly ballot of the session resulted in the election of 61 Associate Members, among whom were Messrs. William Benjamin George Bennett, Borough Engineer, Southampton; John Henry Cox, Borough Surveyor of Bradford, Yorks; James Eldridge, jun., Gas-Works, Oxford; Sidney Gompertz Gamble, Borough Surveyor of Grantham; Septimus Penny, Stud. Inst. C.E., Engineer of the Southend Gas-Works; John Henry Taylor, Town Surveyor, Buxton; and Henry Edward Worsley, Resident Engineer, Kapunda Water-Works, South Australia.

The Water Supply of Richmond (Surrey).—On Friday, the 10th inst. Major Tulloch, one of the Local Government Board Inspectors, held an inquiry relative to an application by the Select Vestry of Richmond for sanction to borrow £18,000 for purposes connected with the water supply of the town. The Vestry Clerk (Mr. F. B. Senior) explained that the £18,000 comprised two separate applications—viz., £10,000 for a new well and works connected therewith, and £8000 for paying off the debt incurred in providing the temporary supply; but although the Vestry had authorized the borrowing of a sum not exceeding £10,000, he was in a position to show that the works connected with the new well would not exceed £8000. Mr. Homersham, C.E., was then called, and explained at some length the details of his plans, after which he was subjected to cross-examination, with the object of showing that the sinking of a new well on the existing site, while it would involve a considerable additional outlay, would not secure the end so much desired by the inhabitants of Richmond—namely, an ample supply of pure water for domestic purposes. Mr. Homersham read the instructions forwarded to him, and stated that he was not consulted by the Water Supply Committee as to the choice of the most suitable site for the proposed well, but was merely asked to turn his attention to what was best to be done for the town under existing circumstances. He was of opinion that the new well proposed to be sunk would answer the object intended. In reply to the Inspector, he stated that the water obtained would be very pure. Replying to the Vestry Clerk, Mr. Homersham said he had estimated the cost of the proposed works at £4500, which he thought was a sufficient sum for the Vestry to borrow for the purpose. Mr. Maxwell (one of the members of the Select Vestry) was asked by the Inspector if he had any alternative proposition to make to the one now submitted, and he suggested that the Vestry should sink a well in Petersham meadows. It was further stated that the water obtained from the new well would not be softer, but would probably be of about the same quality as the present yield from the old well. Evidence was afterwards given by Mr. Peirce, the Resident Engineer, as to the pumping machinery required for the new works. The second branch of the inquiry, as to borrowing £8000 to liquidate the debt incurred for the temporary supply, was next gone into, and the proceedings terminated.

Register of Patents.

APPLICATIONS FOR LETTERS PATENT.

5155.—Toy, S., Birmingham, "Improvements in meters for measuring water and other liquids." Dec. 10, 1880.

5156.—Chamberlain, A. P., Finsbury, London, "Improvements in the manufacture of gas for illuminating, heating, and other purposes." Dec. 10, 1880.

5198.—Wise, W. L., Westminster, "Improvements in carburetting apparatus for the manufacture or treatment of gas for lighting and heating purposes." A communication. Dec. 11, 1880.

5219.—Fiddes, A., Bristol, Gloucester, "Improvements in gas motor engines." Dec. 13, 1880.

5247.—Macdonald, J., Queen Victoria Street, London, "Improved means of and apparatus for increasing the illuminating power of coal gas." Dec. 14, 1880.

5257.—Corbett, J. L., Glasgow, "Improvements in the construction of burners and regulators for governing or controlling the supply or pressure of illuminating gas." Dec. 15, 1880.

5260.—Brett, W., and Abbey, J. B., Huddersfield, Yorks, "Improvements in the method of and apparatus for coupling and uncoupling pipes to water and gas meters and similar purposes." Dec. 15, 1880.

5347.—Robinson, S., Westbromwich, Stafford, "Improvements in engines to be worked by steam, air, or gas." Dec. 21, 1880.

5371.—Denans, J. B., Paris, "Improvements in valves, cocks, or taps for regulating or controlling the flow of liquids, gases, or vapours." Dec. 22 1880.

5390.—Paulson, R., Burdett Road, London, "Improvements in apparatus for utilising the unconsumed gases given off during combustion, prevention of smoke, and the economising of fuel for steam-boiler furnaces, and other furnaces and purposes." Dec. 22, 1880.

5401.—Hamer, F. G., Torquay, Devon, "Improvements in gas-governors." Dec. 23, 1880.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

2422.—Foulis, W., Glasgow, "Improvements in gas-engines." June 15, 1880.

3293.—Grace, G. C., Peckham, London, "Improvements in pressure governors or reducing valves for regulating the pressure of liquids, gas, and air." Aug. 12, 1880.

4041.—Green, N. G., New York, U.S.A., "Improvements in the method of obtaining an increased water supply for cities, towns, manufactories, and for other purposes, and in apparatus for the same." A communication. Oct. 5, 1880.

4297.—Crossley, F. W., Manchester, "Improvements in gas motor engines." Oct. 21, 1880.

PATENT WHICH HAS BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

4088.—Turner, F. W., "Improvements in motors to be worked by gas and air." Dec. 11, 1873.

Return to the Metropolitan Board of Works of the testings made at the gas-testing stations during the week ending Dec. 22, 1880.

Company.	District.	Illuminating Power. (In Standard Sperm Candles.)			Sulphur. (Grains in 100 Cubic Feet of Gas.)			Ammonia. (Grains in 100 Cubic Feet of Gas.)			Sulphuretted Hydrogen.	Pressure.
		Max.	Min.	Mean.	Max.	Min.	Mean.	Max.	Min.	Mean.		
The Gaslight and Coke Company	Notting Hill				Station	closed	for	repairs				
	Camden Town	17·2	16·6	16·9	16·8	14·7	15·7	0·1	0·0	0·0	None.	In excess.
	Dalston	18·4	16·8	17·3	14·4	10·1	12·3	0·4	0·0	0·1	"	"
	Bow	17·9	16·6	16·9	16·1	11·9	13·7	0·4	0·2	0·3	"	"
	Chelsea	17·2	16·7	16·9	15·1	14·1	14·6	0·4	0·0	0·2	"	"
	Kingsland Road	17·3	16·7	17·0	16·9	14·6	15·8	0·1	0·0	0·0	"	"
	Westminster (cannel gas)	21·3	20·8	21·0	23·3	20·0	21·5	0·2	0·0	0·1	"	"
South Metropolitan Gas Company	Peckham	16·8	16·6	16·7	11·2	10·6	10·9	0·4	0·0	0·2	"	"
Commercial Gas Company	Old Ford	17·4	17·0	17·2	15·3	12·6	13·8	0·3	0·1	0·2	"	"
	St. George-in-the-East	17·5	16·8	17·2	9·8	5·3	7·2	0·3	0·0	0·1	"	"

(Signed) T. W. Keates, F.I.C., Consulting Chemist and Superintending Gas Examiner.

Note.—The standard illuminating power for common gas in the Metropolis is 16 sperm candles, and for cannel gas 20 sperm candles. Sulphur not to exceed 20 grains in the 100 cubic feet of gas at Bow station, and 25 grains at all other stations. Ammonia not to exceed 4 grains in the 100 cubic feet of gas. Sulphuretted hydrogen to be entirely absent. Pressure between sunset and midnight to be equal to a column of one inch of water; between midnight and sunset, six-tenths of an inch.

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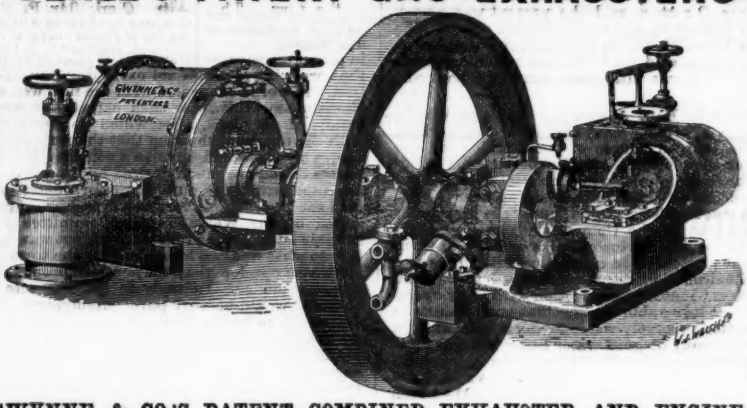
THE GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION, and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & Co., for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.



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Have made the largest and most perfect GAS-EXHAUSTING MACHINERY in the world, and have completed Exhausters to the extent of 14,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.

The Judges report on the COMBINED EXHAUSTER and STEAM-ENGINE exhibited at the Philadelphia Exhibition is —"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

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GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE. Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

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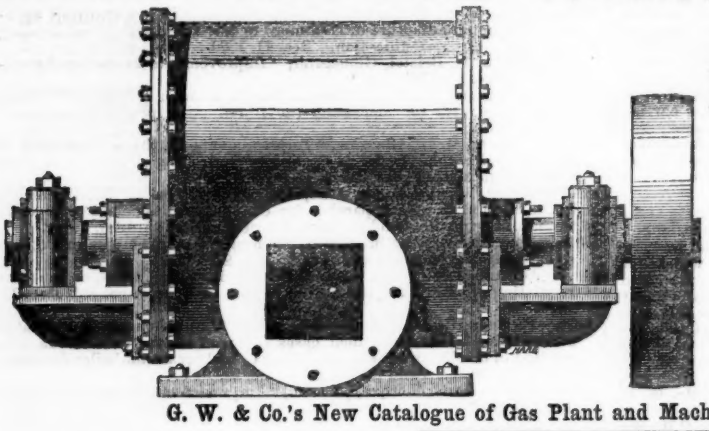
Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,



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WROUGHT-IRON SPINDLES AND
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SCRUBBERS AND PURIFIERS,
CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

PHŒNIX ENGINEERING WORKS:
HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of a Pamphlet, prepared for Gas Companies to distribute to Gas Consumers—"Cooking & Heating by Gas;" on Burners, &c.
Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

WOLVERHAMPTON GAS COMPANY.

WANTED, a Salesman, to Take Charge of the Sale of Gasaliers, Gas-Fittings, and Gas Stoves.
Applications, stating age, previous experience, and salary expected, to be sent in, addressed to the Chairman, on or before Jan. 5, 1881.

TO GAS ENGINEERS AND MANAGERS.

WANTED, by the Georgetown (British Guiana) Gas Company, Limited, an ENGINEER and MANAGER for their Gas-Works, at Georgetown, Demerara.
Salary £300 per annum, with a bonus of £50 for every 1 per cent. per annum paid in dividend over 5 per cent. per annum on the ordinary share capital. The Company are at present paying 8 per cent. per annum on the preference, and 7 per cent. per annum on the ordinary shares; £75 per annum will be allowed for house rent; coke and gas free; the Company also provides a horse and carriage; passage out and home paid for, half salary allowed during passage out and home, and full salary on arrival.
An agreement must be entered into for a period of five years, terminable, at the option of the Company, at the expiration of the first or third year. Form of agreement to be seen at the Office.
Security required to the extent of £500.
The selected candidate must be prepared to leave England not later than the 31st of March next, but will not take charge as Manager until July 25 next.
Applications with testimonials (copies only) to be forwarded to the Secretary of the above Company, 30, Gracechurch Street, London, on or before Jan. 31, 1881.

By order,
ALFRED LASS, Secretary.
Offices, 30, Gracechurch Street, London,
Dec. 17, 1880.

TO GAS MANAGERS.

WANTED immediately, by the Town Commissioners of Newry, a competent MANAGER for their Gas-Works, at a salary of £150 per annum, with residence, coal, and gas.
Applications, with copies of testimonials, to be addressed to the Chairman of the Gas Committee.
JOHN KERNAGHAN, Secretary.
Newry, Dec. 17, 1880.

THE Town Commissioners of Bandon will receive APPLICATIONS from persons competent to discharge the duties of MANAGER and FITTER of their Gas-Works. Salary at the rate of £100 per annum, with residence, coal, and light.
Applications, accompanied with reference and testimonials, to be lodged with me, on or before Saturday, Jan. 1, 1881.
S. R. TRESILIAN, Clerk to the Commissioners.
Bandon, Dec. 9, 1880.

WANTED.—The Advertiser, a Young Man, aged 39, married, is open for an Engagement as MANAGER and SECRETARY of a medium-sized Gas-Works, or SUB-MANAGER of a large Works. Has a thorough Knowledge of the Manufacture and Distribution of Gas in all its branches, having had sole management of Gas-Works for 16 years. Highest testimonials and references.
Address No. 678, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

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About 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12-in. Slide-Valves and 12-in. Connections.
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R. MORLAND, Engineer.

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THE Gas-Works Committee of the Halifax Corporation are prepared to receive TENDERS for the Supply of Fire-Clay RETORTS and BRICKS, during the year 1881.

Forms of tender and further information may be obtained on application to Mr. Wm. Carr, Engineer, Gas-Works, Halifax.

Tenders, properly endorsed, must be sent to me on or before Jan. 6, 1881.

By order,
KEIGHLEY WALTON, Town Clerk.

Town Hall, Halifax, Dec. 24, 1880.

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THE Gas-Works Committee of the Halifax Corporation are prepared to receive TENDERS for the Supply of not less than 3000 yards of Cast-Iron PIPES during the year 1881.

Specifications may be seen and forms of tender and further information may be obtained upon application to Mr. Wm. Carr, Engineer, Gas-Works, Halifax.

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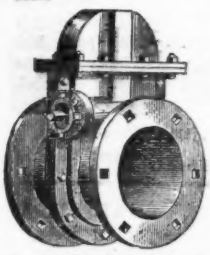

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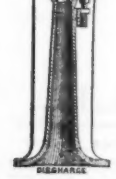

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FREDK. PRITCHARD, Secretary and Engineer.

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Plans and specification can be seen and further information obtained at the Gas Office, 42, Virginia Street.

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Town Clerk's Office, Glasgow, Dec. 24, 1880.

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Two Raking Out or Drawing Machines and two Charging Machines, six Scoop Waggons, with Turntable on top of each and Scoops for same.

One pair of Horizontal Pumping Engines, with 14-in. Cylinders, 2 ft. 6 in. Stroke, with 9-in. Ram Pumps, 2 ft. 6 in. stroke; Fly Wheel about 3 tons, with requisite Stop and Check Valves.

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Town Hall, Rochdale, Dec. 20, 1880.

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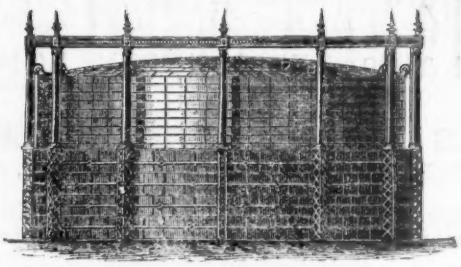

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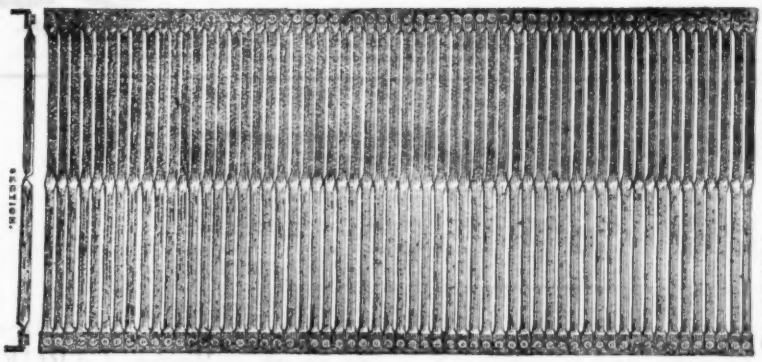

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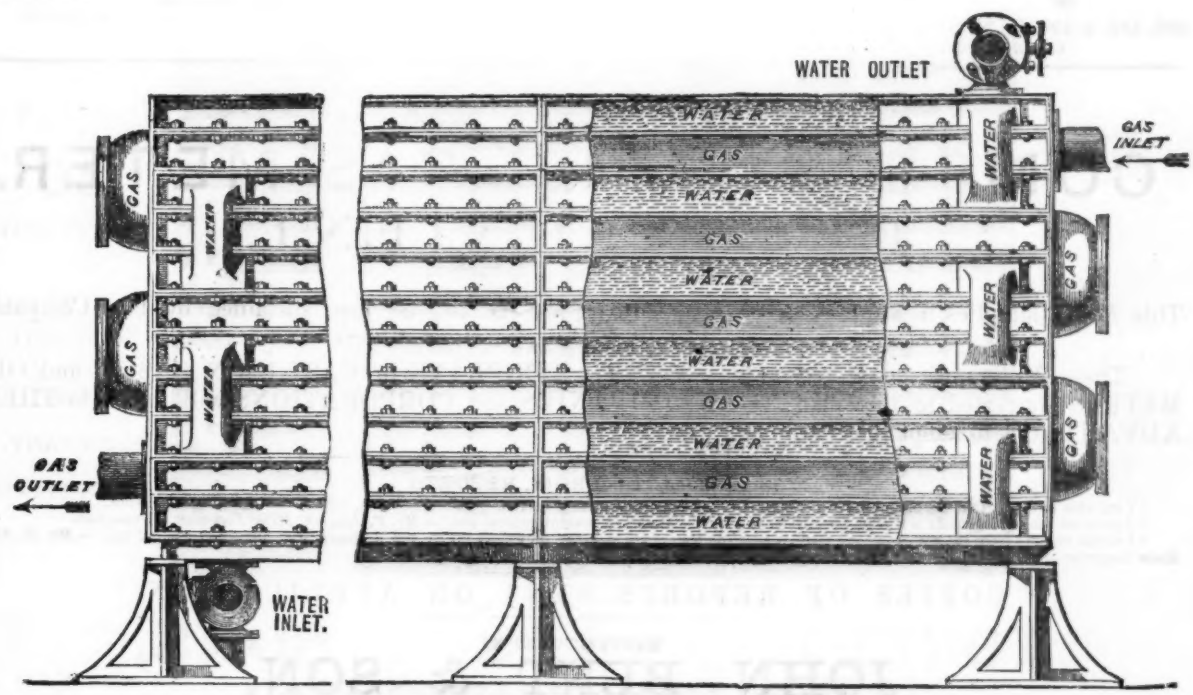

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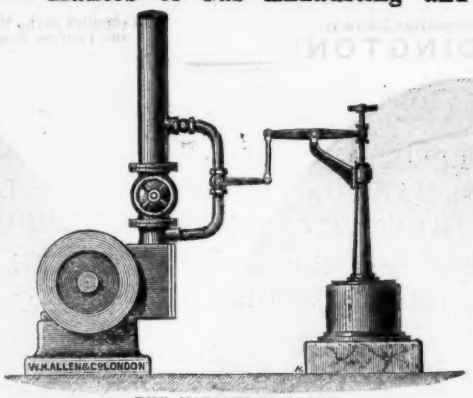

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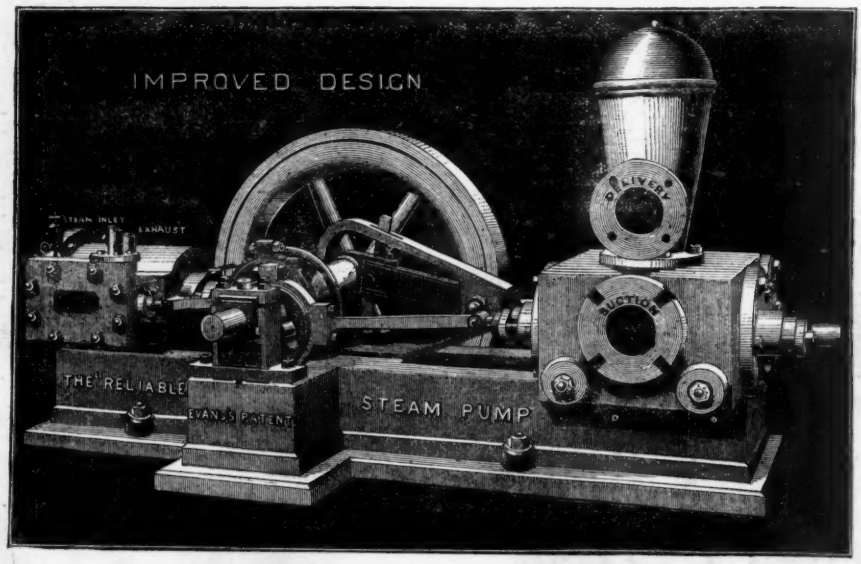

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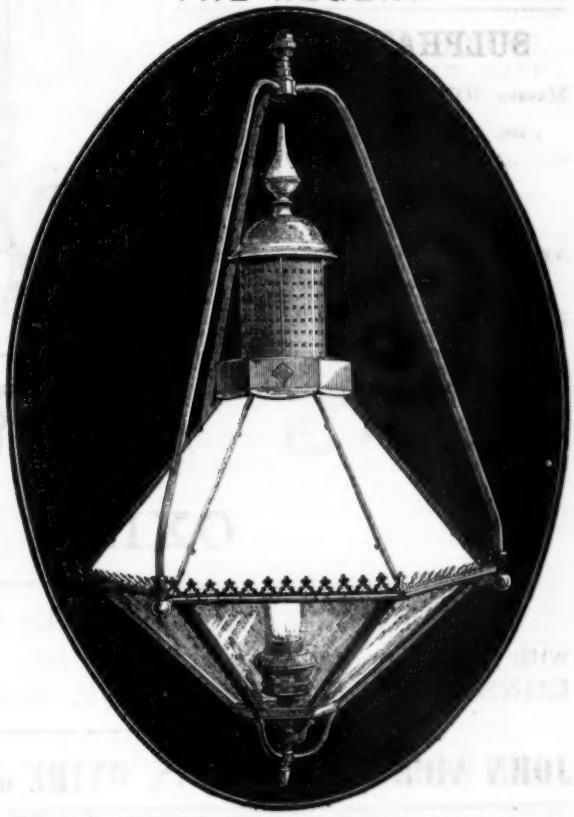

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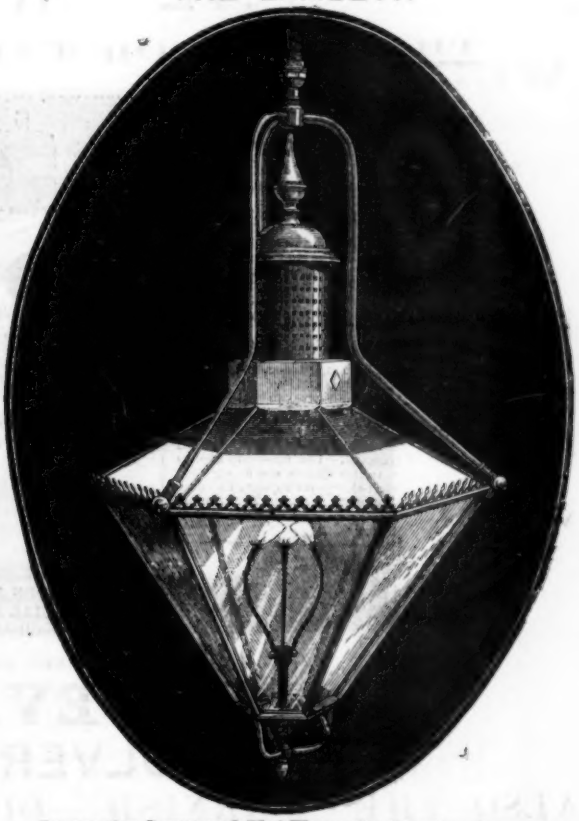

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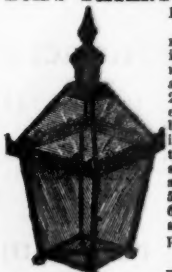
PURIFIERS AND SCRUBBERS.

BOX'S PATENT STREET GAS-LAMP



Has the following good qualities:—

1. No putty or other material is required for glazing. Thus there is no hacking out of old putty on removal of the glass, with the *consequent damage* to the lamp frames. 2. No liability to breakage by unequal expansion of the glass caused by changes of temperature. 3. Any inexperienced workman can glaze the lamp in a few minutes. 4. The system of glazing can be applied to any existing lamp at a trifling cost. 5. It is cheap, strong, and durable. 6. The glass can be easily removed so that the frames can be thoroughly painted inside and out.

The lamp may be supplied fitted with clear opal or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing lamps to this system can be supplied at moderate prices and a small charge for royalty. Licences granted on the most reasonable terms. For further particulars apply to the Patentee,

W. W. BOX,
Gas-Works, Crayford Kent.

RETORT BOLTS,

AND ALL KINDS OF

BOLTS AND NUTS,

SUITABLE FOR

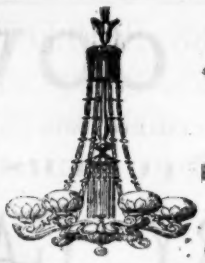
GAS-WORKS,

SUPPLIED BY

JOHN STANSFELD,

Bolt & Nut Manufacturer,

ALFRED ST., BOAR LANE, LEEDS.



F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

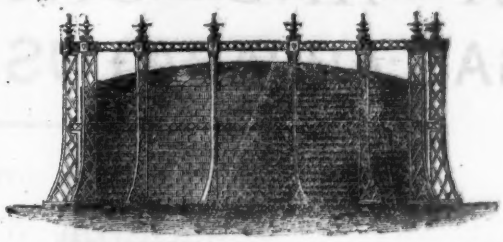
ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

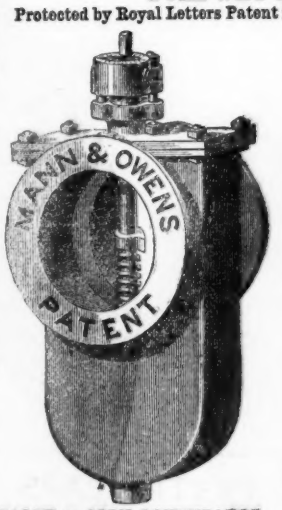
HYDRAULIC, GAS, AND GENERAL ENGINEERS,

WHITEFRIARS STREET, LONDON, E.C.

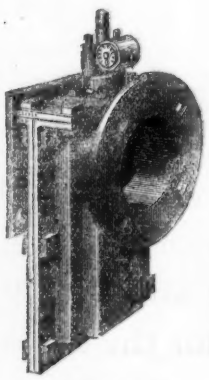
SOLE MANUFACTURERS OF

MANN & OWENS PATENT SCREW AND CAM, ALSO IMPROVED FULL-WAY RACK AND PINION GAS-VALVES.

Protected by Royal Letters Patent in England, France, Belgium, & the United States of America.



VALVE to OPEN DOWNWARDS.



BRIDGE-VALVE for Regulating the Seal of Hydraulic Mains.

VALVE to OPEN UPWARDS.

The SPECIAL ADVANTAGES of MANN AND OWENS' PATENT VALVE are as follows:—

1. Its non-liability to become set fast through varying temperature or from the deposit from crude gas. 2. It is made absolutely gas-tight by the simple action of a screw and cam. 3. Inconvenience through the breakage of springs or wedges setting fast cannot arise. 4. The face of the Valve is scraped and cleaned of any solid matter at each operation of opening or closing.

The Valve can be had to work either in a Vertical or Horizontal position.

Every Valve is carefully tested under pressure, and warranted perfectly sound and gas-tight.

INSTRUCTIONS FOR ORDERING.

State whether required for above or below ground, if Double Flange or Socket and Spigot Valves are wanted, or with loose Flanged Socket and Spigot pieces.

The Prices include Indicators to show extent to which Valve is open.

Also makers of PILLAR-VALVES, SELF-ACTING BYE-PASS VALVES, OUTSIDE RACK AND PINION VALVES, HYDRAULIC-MAIN VALVES, DISC-VALVES, &c.

Every description of Pumping Apparatus, Hydraulic Lifts, &c., suitable for use in Gas-Works, made to order.

PRICES, SIZES, AND FULL PARTICULARS, WITH COMPLETE ILLUSTRATED CATALOGUE, FURNISHED ON APPLICATION.

W. & B. COWAN,

(ESTABLISHED 1827.)

MANUFACTURERS OF

WET AND DRY GAS-METERS,

GAS APPARATUS AND FITTINGS.

Original Licensees and Manufacturers of

WARNER & COWAN'S

PATENT SELF-REGULATING GAS-METER.

STREET-LAMP METERS (with Warner & Cowan's Drums), specially adapted for placing under Roadway, or in Lamp-Pillars.

STREET-LAMP PILLARS, with Pedestals to contain Meters.

GOVERNORS, PRESSURE-REGISTERS, STATION-METERS, TEST-GASHOLDERS, HOURLY RATE AND TESTING METERS, GAUGES, &c.

Manufacturers of

THE AUTOMATIC PRESSURE CHANGER.

(WM. COWAN'S PATENT.)

This Instrument supplies a real want in the most satisfactory manner. It automatically varies the weight or load upon the governor, and consequently the pressure in the main. No personal attention is required, except during a few minutes once a week to wind the clock and weighted pulleys, and, if necessary, to re-arrange the pressures for the succeeding week.

PRICES AND FULL PARTICULARS ON APPLICATION.

Foreign and Colonial Orders provided for by keeping constantly on hand a very large stock of both Wet and Dry Meters, ready for immediate despatch.

CHURCH STREET,
MILLBANK STREET,
(Near the Houses of Parliament,)
LONDON, S.W.

DUTTON STREET,
NEW BRIDGE STREET,
(Near Victoria Station,)
MANCHESTER.

BUCCLEUCH ST. WORKS,
EDINBURGH.

THE MANN & WALKERS' PATENT SCRUBBER.

Extensive use. The successful and extensive use of the Mann and Walkers' Patent Scrubbers in all parts of the world has demonstrated their advantages, and entitled them to be received with credit and confidence. The number of them in use is about twenty times that of any other known means of purifying gas from ammonia.

Small quantity of Water required. By a very small quantity of clean water (not more than 5 or 6 gallons per ton of coals carbonized) the whole of the Ammonia contained in the Gas is completely absorbed; the Gas, after only once passing through, issuing from the Scrubber outlet completely purified from Ammonia. The Scrubber gives no appreciable back pressure.

Residual Product obtained. The Residual Product—namely, the Ammoniacal Liquor—is obtained at from 20 to 30 ounces commercial strength, which enables it, after being mixed with the weaker Liquor from the hydraulic main and condensers, to be sold to the Manufacturing Chemists, or converted into Sulphate, at the degree of strength found most profitable to the Gas Company.

Illuminating power increased. The Scrubber is a Saturator, and the Gas being soaked in this strong solution of Ammonia in the lower columns of the Scrubber, is purified from a large amount of Carbonic Acid, and its Illuminating Power is thereby increased.

Small amount of power required. The friction is so little, and the motion so slow, that the power necessary to work the Scrubber is almost inappreciable. A small gas-engine will work a pair of Scrubbers, purifying 2 million cubic feet of gas per day.

Beckton Gas-Works. There are thirty of these Patent Scrubbers in the Beckton Gas-Works, equal to purifying 30 million cubic feet per day, and the total amount of engine power necessary to work the whole 30 is not equal to that given out by one 10-horse engine.

Reserve purifying power contained. There is also a most important advantage arising from the height of these Scrubbers, in the reserve force contained in them. In the event of any stoppage, the mass of soaked and wetted material would continue the purification for hours, even if the supply of water and working were stopped from any cause.

Internal Materials not changed. The changing of the soaking materials in these Scrubbers is very seldom required; they are well known to remain in action for seven years without being emptied.

Guarantee They are in all cases erected under guarantees; they easily fulfil the stipulations of any Act of Parliament, and the chemical restrictions of the Board of Trade; and in cost they are much less to a Gas Company than any other known means of purifying Gas from Ammonia.

C. & W. WALKER.

8, *Finsbury Circus, London, E.C.*

BRAY'S PATENT LANTERNS

AND

FLAT-FLAME BURNERS,

FROM 40 to 400 CANDLES POWER,

FOR

Lighting Open Spaces, Public Buildings, Railway Stations, Shop Fronts, Hotels, &c.

The understated declaration, with which we introduced our apparatus when the Argand system was in the full tide of its fame, has been fully borne out by general experience, namely—

"THE FLAT-FLAME IS THE ONLY PRACTICABLE SYSTEM FOR STREET LIGHTING; and, 'in actual use,' yields as much light with Common Gas, and more with Cannel Gas, than any Argand System."

BIRMINGHAM LAMP TESTS.

After a series of experiments, extending over more than twelve months, WITH THE MOST EXTENSIVE ASSORTMENT OF BURNERS AND LANTERNS of large lighting power ever brought together, THE BIRMINGHAM AUTHORITIES

ADOPTED BRAY'S SYSTEM

for their street-lighting improvements, for which purpose SIXTY-FIVE 100-CANDLE POWER LANTERNS of medium lighting power have been fixed, SINCE WHICH WE HAVE RECEIVED ORDERS FOR **26** MORE.

The tests showed that our 80-candle **highest** lighting power burner yielded 3·51 candles per foot of gas, which was a higher result than that yielded by any other flat-flame burner (though there were copies of our enlarged and improved Slit-union Burners sent by another party), and higher than the 80-candle power Arganda.

IN THE BRITISH ASSOCIATION OF SCIENCE TESTS, 1878,

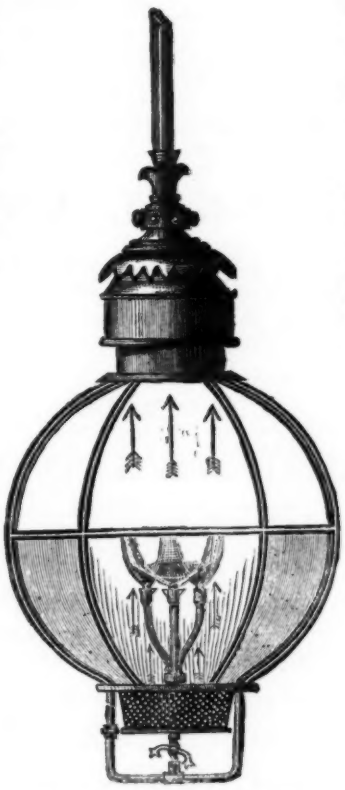
The highest results obtained by the Burners of the parties here named were:—

	Candles per Five Cub. Ft. of Gas.	Price. s.	d.
Bray's Flat-flame	23·68 ..	0	2
Sugg's do.	23·56 ..	5	6
Sugg's Double-ring Argand .	23·33 ..	18	0

(*See Journal of the Society of Arts, Feb.* 7, 1879.)

The report delivered this year repeats the above UNPARALLELED TESTIMONIAL, by again placing us at the head of all flat-flame burner makers, although copies of our enlarged and improved Slit-union Burners were sent, under another name, by another party.

Note.—It will assist people's judgment if we state that the Argand system has been removed from Waterloo Place, Queen Victoria Street, Billingsgate Market, and other places in London; Sackville Street, Dublin; and Market Place, Nottingham; and that scarcely a week passes but we have applications for Burners and Lanterns TO DISPLACE THE ARGAND APPARATUS.



THE NORTH BRITISH RAILWAY (QUEEN ST.) STATION, GLASGOW, is now being lighted with 30 of **BRAY'S PATENT LANTERNS.**

THE NEW CALEDONIAN RAILWAY STATION, CARLISLE, is to be lighted with 107 of **BRAY'S PATENT 80-CANDLE POWER GLOBULAR LANTERNS.**

BRAY'S SYSTEM OF STREET LIGHTING has been adopted by the CORPORATIONS, VESTRIES, and GAS COMPANIES of nearly ALL THE LARGE CITIES AND TOWNS IN THE UNITED KINGDOM.

PRICES AND PARTICULARS ON APPLICATION TO

GEORGE BRAY & CO., LEEDS.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

TREES BOGHEAD.

SHOTTS BOGHEAD,

And all the first-class Scotch Cannels.

Prices and Analyses on application.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either *f. o. b.* or *by rail*, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over 10,000 cubic feet of gas, with an illuminating power of 16 candles; or* by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

GAS COAL.

THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analysed by Mr. James Paterson, of Warrington, yields 12,600 *cubic feet of 16·67-candle gas, with 1430 lbs. of good Coke, per ton.* Ash in Coke, 1·88.

Apply to the MIRFIELD COLLIERY, Mirfield, NORMANTON. London Agent: MR. F. J. LEE SMITH, Bromley, KENT.

HUCKNALL TORKARD CANNEL.

The HUCKNALL COLLIERY COMPANY can offer a Cannel producing a considerable quantity of Gas of good quality.

For analysis and price apply to the Company at their

HUCKNALL TORKARD COLLIERIES,

NEAR NOTTINGHAM.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS,

LIMITED,

MANUFACTURERS OF

PATENT CLAY RETORTS,

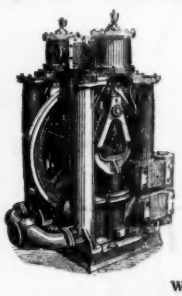
AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES,

BENDS, JUNCTIONS, &c.

Fire-Bricks, Tiles, Blocks, and Chimney-Tops.

John Cameron's Specialities



ARE HIS

PATENT LEVER

PUNCHING MACHINES

AND HIS

STEAM-PUMPS

FOR

GAS-WORKS,

Feeding Boilers, Steam Fire-Engines, Colliery Deep Lifts, Irrigation, Contractors, and Chemical purposes.

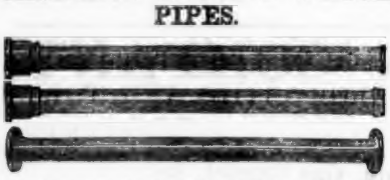
WORKS:

OLDFIELD ROAD, SALFORD, MANCHESTER

WILLIAM MACLEOD & CO.,

30, ST. ENOCH SQUARE, GLASGOW.

CAST-IRON GAS AND WATER PIPES.



Sole Agents in Scotland for the Torbay Paint Co.

Prices on application.

FERRAND DAVIES,

148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL,

AND

NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

WILSON CARTER AND PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES.

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

LONDONDERRY GAS COALS

DIRECT FROM THE

MARQUESS OF LONDONDERRY'S COLLIERIES.

COUNTY OF DURHAM.

For Prices and Particulars, apply to

MR. S. J. DITCHFIELD,

LONDONDERRY OFFICES, SEAHAM HARBOUR, COUNTY OF DURHAM.

London Agents: Messrs. LAMBERT BROS., 85, GRACECHURCH ST., E.C.

CANNEL AND GAS COALS.

THE DUKINFIELD COAL AND CANNEL COMPANY are prepared to deliver, to any Station, their Celebrated GAS COALS, which have a very high reputation for quantity of Gas and Illuminating Power, and make a First-class Coke.

Analyses and terms of delivery may be obtained by communicating with the above Company, at their Offices,

DUKINFIELD, NEAR MANCHESTER.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

J. & H. ROBUS,

BUILDERS AND CONTRACTORS

FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,

RETORT-SETTING—A SPÉCIALITÉ.

ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.

ESTIMATES GIVEN FOR MAIN-LAYING.

N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.

Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Twenty-Eight Illustrations and Letterpress, on the Construction of Gas-Works, will be sent, post free, on receipt of 4s. in stamps To be had of the AUTHOR; or at the Office of the "JOURNAL OF GAS LIGHTING."

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

OXIDE OF IRON

FOR THE

PURIFICATION OF GAS,

SUPPLIED DIRECT FROM THE

IRONSTONE MINES OF THE PROPRIETOR.

THIS OXIDE IS GOOD IN QUALITY AND LOW IN PRICE.

ADDRESS ALL INQUIRIES TO THE SOLE AGENT—

ALBERT USHER,

5 OFFICE, FINSBURY PARK RAILWAY STATION, LONDON, N.

C. & W. WALKER'S PATENT COMPLETE CONDENSER.

THIS CONDENSER, of MOST ECONOMICAL COST, not only EFFECTUALLY COOLS GAS by its LARGE AREA of COOLING SURFACE, but also EXTRACTS ALL TAR, performing both operations WITHOUT APPRECIABLE BACK PRESSURE.

For Drawings and Prices, apply, giving largest quantity of Gas produced per 24 hours, to

C. & W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

IMPROVED CENTRE-VALVES,

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

ALDWARKE MAIN AND CAR HOUSE COLLIERIES,

Near ROTHERHAM.

JOHN BROWN & CO., LIMITED,

ATLAS STEEL AND IRON WORKS, SHEFFIELD.

PROPRIETORS.

The Aldwarke Main Brights is a first-class gas-making and coking Coal, yielding by analysis 12,600 feet of 19-candle gas per ton, and giving "Weight of illuminating matter in lbs. of sperm, 820·80." It is very free from impurities and foreign matter.

Copies of Analyses made by Gas Companies who have used it will be forwarded and Samples sent on application.

GAS COAL. GAS COAL. GAS COAL.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

Near BARNSLEY.

This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.

THE WIGAN COAL & IRON COMPANY,

LIMITED.

MIDLAND DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: A. C. SCRIVENER,

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known **HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.**

CROLL'S
DRY GAS-METERS,

PRIZE MEDALS.
LONDON, 1851;
NEW YORK, 1853;
PARIS, 1855.

(INVENTED & PATENTED IN 1844,)

COMBINING ALL THE LATEST IMPROVEMENTS,

MANUFACTURED ONLY BY

PRIZE MEDALS.
LONDON, 1862;
DUBLIN, 1865;
PARIS, 1867.

THE GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON, N.E.

SOLE AGENT FOR SCOTLAND: JAMES KEITH, EDINBURGH AND ARBROATH.

OF IMMEDIATE IMPORTANCE TO ALL GAS FACTORIES.

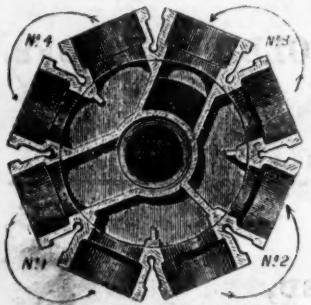
HARRIS & PEARSON, of Stourbridge, have an immense stock of **FIRE-CLAY GAS RETORTS,** all perfect and in good condition, and can supply orders of any magnitude, to any size or pattern, immediately on receipt of specification. Any Gas-Works disappointed by delay in the execution of Retort orders will do well to take advantage of this. Inspection invited.

HARRIS & PEARSON manufacture best Retort Bolts, Cast Iron Retort Mouthpieces, Fittings, and Lids, Cast Iron Gas and Water Pipes, and Connections of all Shapes and Sizes.

Glazed Bricks, white and in colours, Porcelain Baths, Fire-Clay Goods of all kinds, Hard Blue Paving Bricks for Retort Houses.

Prices, Drawings, and Specifications if desired.

Please note carefully the Address:—"HARRIS & PEARSON, STOURBRIDGE," as there are other Firms similar in name.



PATENT RECESSED CONE CENTRE-VALVE.
Sectional Plan.

R. LAIDLAW AND SON,

EDINBURGH AND GLASGOW,

SOLE MAKERS OF

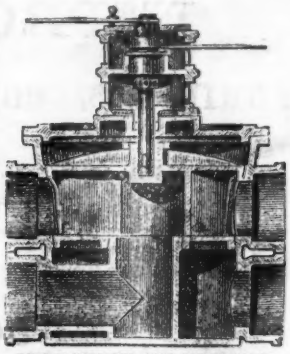
PATENT

RECESSED CONE CENTRE-VALVES,

Constructed on the principle of the ordinary Plug-Cock.

THROUGH-WAY & FOUR-WAY COCKS

Of all descriptions.



PATENT RECESSED CONE CENTRE-VALVE.
Sectional Elevation.

London Office: 6, LITTLE BUSH LANE, CANNON STREET.

D. HULETT & CO.

Invite the attention of Gas Companies, Corporations, and others to their

PATENT STREET LAMPS,

Which are so constructed that neither putty nor other materials are required to secure the glass. No hacking out of old putty, which frequently destroys the frames. A new pane of glass can be inserted in two or three minutes by any inexperienced person, the glass being secured by a hinged flap and turn button.

PRICE, with Opaline Reflecting Top, 12s.; with Fluted Glass Top, 10s. 6d.
Also made **EXTRA STOUT** recommended for its durability.

D. HULETT'S IMPROVED SERVICE CLEANSER,

By the use of which stoppages in service and other pipes are freed from naphthaline and other obstructions in a few minutes. PRICE 73s. net.

HULETT'S PATENT MERCURIAL REGULATOR,

For inserting in mains, to prevent the excess of pressure in high ground, or other elevated positions.

PATENTEES OF IMPROVED WET AND DRY GAS-METERS.

Makers of all kinds of Pressure-Gauges, Gaseliers, and every kind of Gas-Fittings for the Trade.

GAS HEATING AND COOKING STOVES.

55 and 56, HIGH HOLBORN, LONDON.

London Printed by WALTER KING (at the office of Clayton & Co., 17, Bouverie Street, Fleet Street), and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, December 28, 1880.